

MicroSCADA Pro SYS 600 9.2

Installation and Administration Manual



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1. Introduction

1.1. This manual

This manual provides thorough information on the SYS 600 software and hardware installation: base systems, LAN connections, process communication systems, workplaces and peripherals.

1.2. Use of symbols

This publication includes the following icons that point out safety-related conditions or other important information:



The caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in corruption of software or damage to equipment or property.



The information icon alerts the reader to relevant facts and conditions.

It should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to information or property loss. Therefore, comply fully with all notices.

1.3. Intended audience

This manual is intended for installation personnel, administrators and skilled operators to support installation of the software.

1.4. Product documentation

Name of the document	Document ID
SYS 600 Connecting LONWORKS Devices	1MRS756154
SYS 600 IEC 61850 System Design	1MRS756119
SYS 600 Status Codes	1MRS756178
SYS 600 System Configuration	1MRS756112
SYS 600 System Objects	1MRS756177
SYS 600 OPC Server	1MRS756174
LIB 500 *4.2. Operation Manual	1MRS755359
LIB 500 *4.2. Configuration Manual	1MRS755360
SYS 600 Programming Language SCIL	1MRS756176
SYS 600 CDC-II Slave Protocol	1MRS756188
SYS 600 External OPC Data Access Client	1MRS756163
SYS 600 Communication Gateway, COM 500/ User's Guide	1MRS756157
RER 111 Technical Reference Manual	1MRS750104-MUM

Other related documents:

- Citrix documentation
- LONWORKS PCLTA-20 PCI LonTalk Adapter, User's Guide
- Microsoft Windows documentation
- Product documentation of the used multiport serial card
- Product documentation of the used network adapter card
- Product documentation of the used PCLTA-10 card
- RTU documentation

1.5. Document conventions

The following conventions are used for the presentation of material:

- The words in names of screen elements (for example, the title in the title bar of a dialog, the label for a field of a dialog box) are initially capitalized.
- Capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, press the CTRL key. Although the Enter and Shift keys are not labeled they are written in capital letters, e.g. press ENTER.
- Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the space bar, comma key and so on.
- Press CTRL+C indicates that you must hold down the CTRL key while pressing the C key (to copy a selected object in this case).
- Press ALT E C indicates that you press and release each key in sequence (to copy a selected object in this case).
- The names of push and toggle buttons are boldfaced. For example, click **OK**.
- The names of menus and menu items are boldfaced. For example, the **File** menu.
- The following convention is used for menu operations: **Menu Name > Menu Item > Cascaded Menu Item**. For example: select **File > Open > New Project**.

- The **Start** menu name always refers to the **Start** menu on the Windows Task Bar.
- System prompts/messages and user responses/input are shown in the Courier font. For example, if you enter a value out of range, the following message is displayed: Entered value is not valid.

You may be told to enter the string MIF349 in a field. The string is shown as follows in the procedure: MIF349

- Variables are shown using lowercase letters: sequence name

1.6.

Document revisions

Version	Software revision number	Date	History
A	9.2	27.07.2007	Document created
B	9.2	30.10.2007	Document updated

2. Installation

2.1. Installing system servers

2.1.1. Hardware requirements

The MicroSCADA Pro base system sets the following minimum configuration requirements. Follow Microsoft's recommendations for supported operating systems, Windows XP, Windows 2000, Windows Server 2003 as shown in the Table below.

Table 2.1.1.-1 Hardware requirements

Operating System	Hardware	Available Disk minimum	Memory
Windows XP	2 GHz	20 GB	2 GB
Windows 2003 Server	2 GHz	20 GB	2 GB
Windows 2000	2 GHz	20 GB	2 GB

Other hardware requirements:

- Echelon PCLTA-20 LON adapter requires one PCI-bus slot. One card supports one LON channel. XLON PCI from DH Electronics takes also one slot per channel. Adlink PCI-1760 or Nudaq PCI-7250 or PCI-7256 I/O cards require one PCI slot.
- Depending on the size of the application, MicroSCADA Pro requires approximately 100 to 500 MB of disk space. The recommended total disk capacity is at least 2GB. Any SCSI or IDE controller or RAID configuration supported by Windows operating system can be used.
- The recommended RAM size is 512 MB or more.
- If the base system computer is also used as an operator's workplace, the screen resolution should be at least 1024x768 pixels. The graphics adapter should support at least a 256 color mode or a true color mode. To ensure high ergonomics, the refresh rate of the screen should be at least 70 Hz for CRT-screens.
- Any keyboard and mouse supported by Windows can be used.
- A CD-ROM device is recommended for Windows installation.
- A parallel port can be used for connecting a printer.
- Any Ethernet adapter supported by Windows can be used for connecting the base system computer to the LAN.
- A PC 31/32 radio clock board from Meinberg Funkuhren, Germany, can be used for synchronizing the clock. The board contains a radio receiver for the Frankfurt DCF-77 77 kHz radio transmitter. Optionally the PC 32 board can be connected with a serial line to a GPS receiver.
- The Control RocketPort multi-port serial communication board can be used to provide the PC-NET with up to 8 COM ports. Moxa and Digi serial port adapters are tested as well.

2.1.2. Software requirements

The MicroSCADA Pro system supports the following operating systems:

- Microsoft Windows 2000 Professional
- Windows 2000 Server
- Microsoft Windows XP Professional or
- Microsoft Server 2003 Standard Edition.

Other server versions might be compatible with MicroSCADA; however those are not supported by this software.

For more information about operating systems, refer to Microsoft documentation.

The user documentation is available as PDF files on www.abb.com/microscada, both as part of the product package and as separate files.



Adobe Acrobat Reader is not supplied with MicroSCADA Pro, but can be downloaded for free from <http://www.adobe.com/products/acrobat/readstep2.html>

MicroSCADA Pro supports only the 32-bit version of the operating system.

Additional software

The Hummingbird eXceed version 7.0 or newer is required as an X-server on the workstation computer whenever the system includes distributed HSI (Human System Interface), and uses MicroSCADA X and VS Remote monitor types (Classic workplaces).

2.1.3. Installation procedure

The MicroSCADA Pro base system installation procedure:

- Install the network adapter card if a local area network is to be used.
- Install the operating system.
- Install corresponding device drivers and protocols for the local area network.
- Install the PC cards used by MicroSCADA Pro: PC-NET cards, I/O units, LON adapter cards and radio clock cards.
- Install the X-server software, Exceed, if MicroSCADA Pro X-monitors or VS remote monitors are shown on the base system computer display.
- Install the MicroSCADA Pro base product software.
- Install optional products, if used: LIB 500 and LIB 5xx.
- Add and prepare applications.
- Configure, test and start the possible drivers.

- Modify the base system configuration files to match the actual configuration.
- Perform administrative tasks: define the startup type, change passwords, share resources, and so on.

2.1.4.

Installing SYS 600

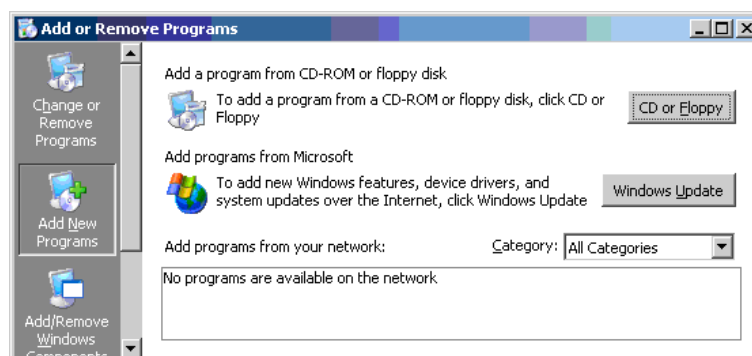
The MicroSCADA Pro installation package contains an installation program, which creates the directory structure and copies the required files to your hard disk. By default, the installation program also creates a new program folder named MicroSCADA Pro Control System SYS 600 icons on the desktop. Any previously installed MicroSCADA Pro software does not need to be removed before a new installation. The old files will be overwritten, except for the following ones:

- SHUTDOWN.CIN (in the folder \sc\prog\exec). Installation preserves the old version of SHUTDOWN.CIN. The new version is copied into the same directory and named SHUTDOWN\$CIN.
- PC_NET.CF1, PC_NET.COM, SYS_BASCON.COM, SYS_CONFIG.PAR, MONITORS.DAT and SYS_NETCON.COM (in the folder \sc\sys\active_sys_). Installation preserves the old versions and the new versions are copied into same directory and named PC_NET\$CF1, PC_NET\$COM, SYS_BASCON\$COM, SYS_CONFIG\$PAR, MONITORSS\$DAT and SYS_NETCON\$COM respectively.

The applications located under the \sc\apl directory are not touched. The application TUTOR and WD can be overwritten. The installation program asks whether to do that or not.



When installing MicroSCADA Pro or some other programs on server versions of operating systems (2000/2003) use Add New Programs in the Control Panel and browse the installation package. This will switch Terminal Services automatically between install and run mode.



A070500

Fig. 2.1.4.-1 Add or Remove Programs window

MicroSCADA Pro installation procedure

To install the MicroSCADA Pro base product software:

1. Restart the computer to remove possible memory resident data.
2. Logon as a user with administrator rights.
3. Double-click the installation icon to start the installation. It is recommended to install using Add/Remove Programs from the Control Panel.
4. In the Product Installation dialog the software packages are listed, see Fig. 2.1.4.-2. Select the software packages that you want to install by selecting the appropriate check box.



A051494

Fig. 2.1.4.-2 Selecting products to be installed.

Program	contains MicroSCADA main program and must be installed in SYS PC.
Workstation	monitor opening application (mons) is installed for VS and X Monitor types
Documentation	will install documents

In practise, all three packages are installed in the SYS PC. This will allow opening VS monitors locally on SYS PC and reading documents. Workstation package is installed on workstation PC if VS/X -type monitors are used.

5. Select the drive in which the application is to be installed. The installation program suggests a destination drive for the MicroSCADA Pro installation. If MicroSCADA Pro has been installed before, the destination drive used in the previous installation is shown as a default drive. Otherwise, the default drive is C. To select another drive, click **Change Drive** and choose the drive.



MicroSCADA Pro must be installed on a disk drive physically located in the base system computer. It cannot be installed on a logical disk drive, for example a network drive.

6. After selecting the components to be installed, click Start. If a previous installation of the selected software package is detected, a System Information dialog is shown.
7. After the System Base Software has been installed, type a password for a MicroSCADA user, see Fig. 2.1.4.-3. The MicroSCADA user is created during the installation. It belongs to the Administrator group and it is the user who owns the MicroSCADA processes.

The MicroSCADA user performs all references made by the processes. If two base system computers share resources, the MicroSCADA user should be given the same password on both computers. The password can be changed later from the MicroSCADA Pro Control Panel.



This user name should not be used for purposes other than administration tasks. If the MicroSCADA user already exists due to a previous installation, the password is not changed.

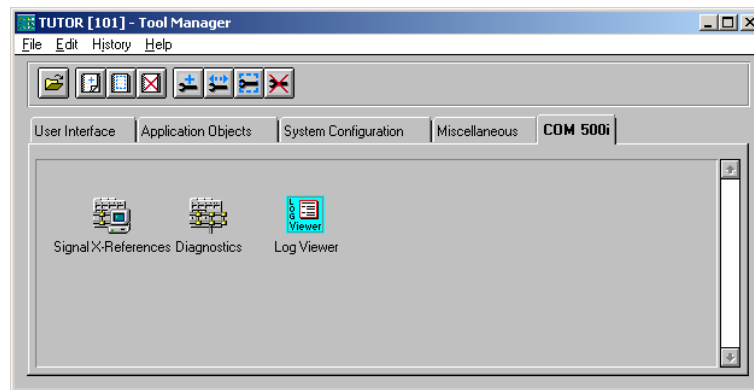
A051498

Fig. 2.1.4.-3 MicroSCADA User Password dialog

8. After base software is installed, other selected packages are installed.
9. The installation completed dialog is shown when MicroSCADA Pro has been installed.

Installing COM 500i

Existing product COM 500 is included in SYS 600 9.2 or newer as a functionality - COM 500i that is license dependent. COM 500i is a communication gateway running on a MicroSCADA Pro platform. It provides a gateway between process devices and eight Network Control Centers (NCC). The main tasks of COM 500i are signal rerouting and protocol conversions. A COM 500i tab is constructed, when the SYS 600 is started for the first time. Select the COM 500i tab from the Tool manager to use the COM 500i functions, see Fig. 2.1.4.-4.



A060262

Fig. 2.1.4.-4 COM 500i



COM 500i also handles the situation, when an existing COM 500 product is upgraded to SYS 600 9.2 or newer version.

Installing Microsoft Message Queuing (MSMQ)

Microsoft Message Queuing (MSMQ) is installed during SYS 600 installation and the following installation steps are required if MSMQ is not already installed as part of operating system installation.



Microsoft Windows installation disc may be required to complete the installation.

To install Microsoft Message Queuing (MSMQ) on Windows 2000

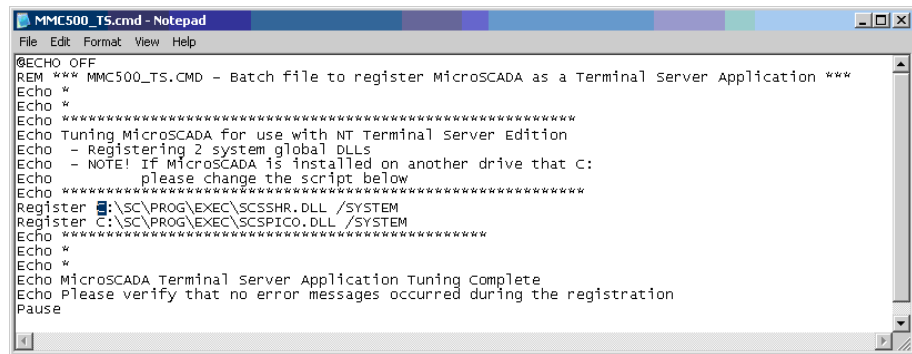
1. In the Windows Components wizard, check Message Queuing.
2. Click **Next**.
3. Select Independent client.
4. Click **Next**.
5. Select Message queuing will not access a directory service.
6. Click **Next** to complete installation.

To install Microsoft Message Queuing (MSMQ) on Windows Server 2003

1. In the Windows Components wizard, select Application Server.
2. Click **Details**.
3. Check Message Queuing.
4. Click **OK**.
5. Click **Next** to complete the installation.

To install in Terminal Services environment

After program installation, edit MMC500_TS.cmd to match installation drive, then run the command file. In a multi user environment like Terminal Server, Dynamic Link Libraries (the .DLL files) may fail to open if more than one user attempts to use them. The REGISTER utility allows you to tell the system that a particular .DLL file should be made available globally to the system and to all users.



A070501

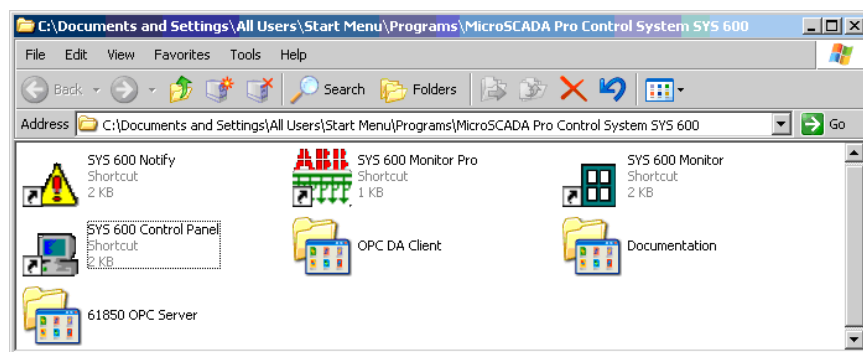
Fig. 2.1.4.-5 Editing command

2.1.5.

Verifying SYS 600 installation

During the installation of the MicroSCADA Pro kernel software, two empty applications are created. The two applications are named TUTOR and WD.

The desktop icons for the MicroSCADA Pro Control System SYS 600 is created during the installation. See Fig. 2.1.5.-1.

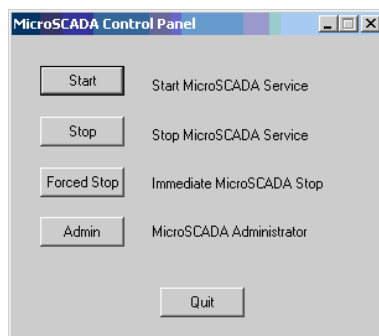


A070508

Fig. 2.1.5.-1 Desktop icon

SYS 600 Control Panel

The SYS 600 Control Panel dialog contains application management tools. The MicroSCADA system can be started by clicking **Start** and stopped by clicking **Stop** from these Application management tools.

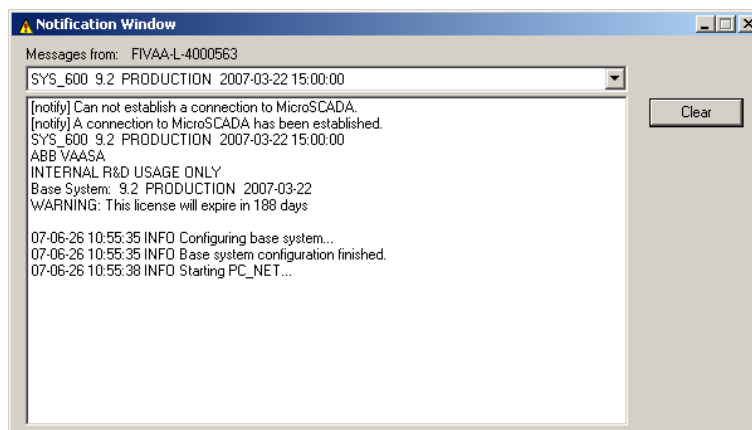


A051222

Fig. 2.1.5.-2 MicroSCADA Control Panel

SYS 600 Notify

The revision information and all the possible error messages that occur during the start-up and operation of SYS 600 are shown in the Fig. 2.1.5.-3.

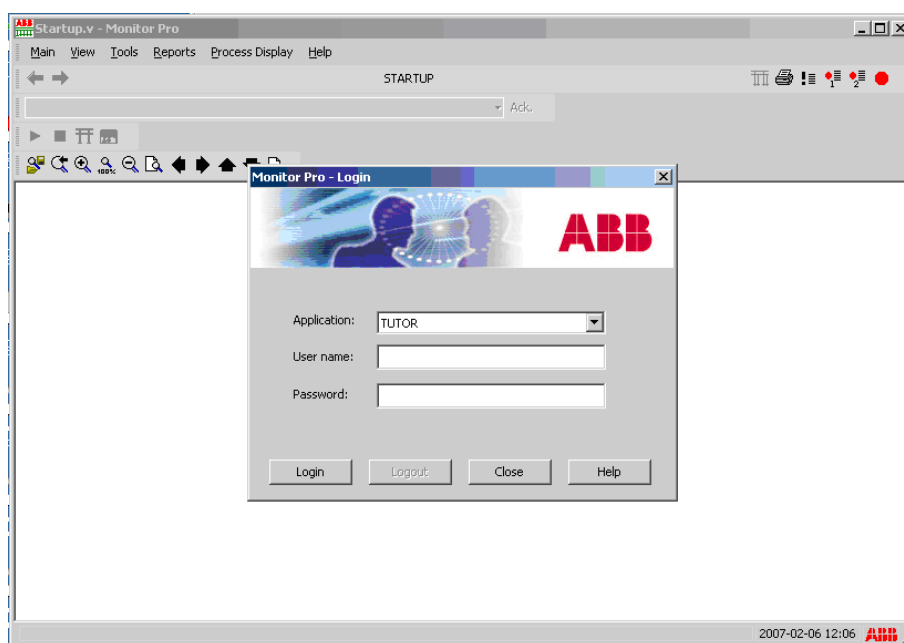


A070509

Fig. 2.1.5.-3 SYS 600 Notification Window

SYS 600 Monitor Pro

When an operator wants to supervise an application on a monitor screen of type VS or X, the operator opens a MicroSCADA Pro monitor.

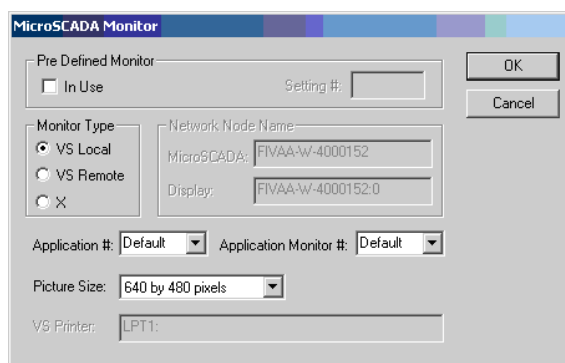


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Fig. 2.1.5.-4 Monitor Pro Startup Window

SYS 600 Monitor

When an operator wants to supervise an application on a monitor screen of type VS or X, the operator opens a SYS 600 Monitor with the MicroSCADA Monitor dialog.

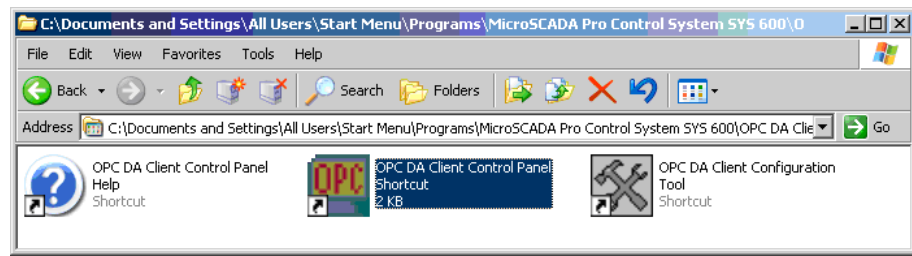


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Fig. 2.1.5.-5 MicroSCADA monitor dialog

External OPC DA Client

Installation and Administration Manual



A070511

Fig. 2.1.5.-6 External OPC DA Client

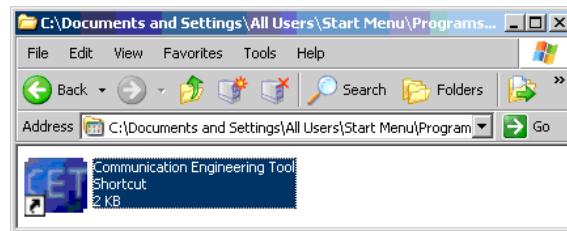
The shortcut menu for External OPC DA Client Control Panel provides a link to External OPC DA tools.

Documentation

This icon links to Status Codes and Operation Manual.

61850 OPC Server

This icon links to Communication Engineering (CET) tool.



A070512

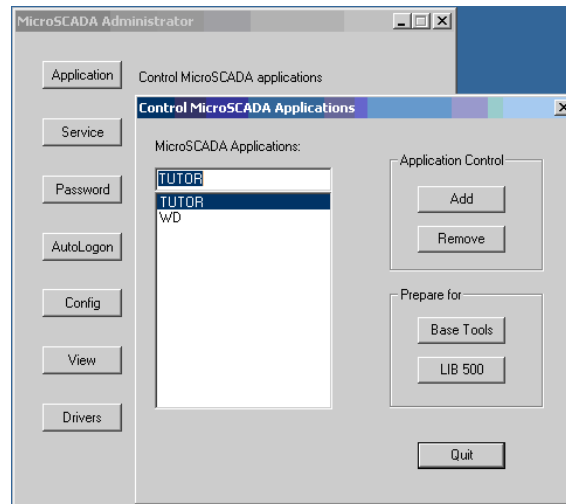
Fig. 2.1.5.-7 CET Tool

Applications

You can add additional applications by using the administration tools accessed from the MicroSCADA Control Panel. The MicroSCADA administration tools also provide means for listing and removing applications. When you add an application, the application directories for the new application are created. The startup and initialization pictures and dialogs are copied to the application directory apl_.

To open the Control MicroSCADA Applications dialog:

1. Open the MicroSCADA Control Panel by double-clicking the icon.



A070513

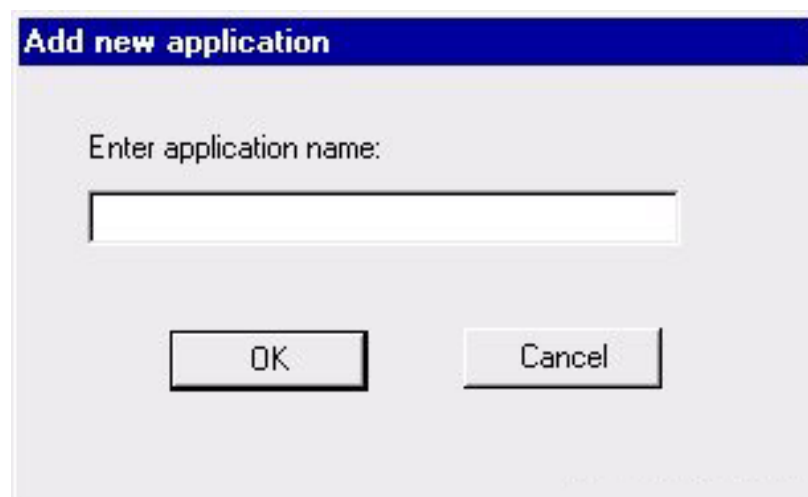
Fig. 2.1.5.-8 Control MicroSCADA Applications dialog

2. Click **Admin**.
 3. Click **Applications** to open the Control MicroSCADA Applications dialog.
- In this dialog, it is possible to view, add, prepare and remove the applications.

Adding applications

To add a new application:

1. In the Control MicroSCADA Applications dialog, click **Add** to open the Add new application dialog, see Fig. 2.1.5.-9.



A051504

Fig. 2.1.5.-9 Adding new application

2. Type the name of the application to be created.
3. Click **OK**.

The new application directory and its subdirectories are created under the \sc\apl directory. The initialization and startup pictures and dialogs are copied into the pict subdirectory of the new application.

Preparing applications

When preparing an application, the necessary startup and initialization files are copied to the application directory. If application is added as described before, it is also prepared and no further preparations are needed. However, if MicroSCADA is updated, applications need to be prepared again to use tools properly.

To prepare an application:

1. Open the Control MicroSCADA Applications dialog.
2. Select the application to be prepared.
3. Click **Base Tools**.
4. Select one of the following options:
 - Full prepare - copies all the initialization files and pictures to the application directory. The possible existing files are overwritten.
 - Limited prepare - to copy initialization files but not the APL_INIT and APL_START pictures. Use this option if you wish to keep the existing APL_INIT and APL_START files. For instance, if you have prepared the application for LIB 500, you should use Limited prepare.

If LIB 500 is used, prepare the applications for LIB 500.

1. Open the Control MicroSCADA Applications dialog.
2. Select the application to be prepared.
3. Click **LIB 500** and refer to the LIB 500 documentation to complete the preparation.

Removing applications

To remove an existing application:

1. Open the Control MicroSCADA Applications dialog.
2. Select the application to be removed.
3. Click **Remove** to remove the selected application directory and its sub-directories.



Using this utility physically removes the application from the SYS 600 computer file system. Therefore it is important to verify that the backup of the application exists, in case it is required for later use.

2.2. Local Area Network (LAN)

A local area network (LAN) is a group of computers and associated devices that share a common communications line or wireless link. Local area networks are built with hardware such as Ethernet cables, network adapters, hubs and managed or unmanaged switches. Wireless LAN and other more advanced LAN hardware options also exist. LANs connect MicroSCADA workstations and SYS 600 computers and other supported devices like IEDs using IEC 61850 protocol. Each individual device connected to LAN has its own IP address. They are able to access data and devices anywhere on the LAN, they can share resources on LAN. Users can also use the LAN to communicate with each other. There are many different types of LANs. Our scope is on Ethernet and used protocol is TCP/IP. See detailed installation instructions from corresponding Windows Operating System manual.

2.2.1. Network interface card

Each computer on the LAN contains a network interface card and software for handling the card and the used protocols.

Insert the network interface card before installing the Windows operating system. Most computers are equipped with a built-in network interface card. The LAN software is installed and configured during the operating system installation.

2.2.2. IP addresses

The communication protocol supported by MicroSCADA is TCP/IP.

Each node or host in a TCP/IP network has a unique identifier, also called an IP address. The IP address is composed of four numbers in the range from 0 to 255. The numbers are separated with dots. For example: 192.168.0.1

The smallest LAN can have exactly two computers, a large LAN can accommodate many thousands of computers. Because every computer on an IP network must have a unique IP address, careful planning of IP addresses to the whole system is important. You should remember to take care of the future needs in address areas when planning large networks.

There are some special IP addresses. 127.0.0.1 is known as the loopback address and it always refers to the local computer. Hostname used for the address is 'localhost'.

Use static addressing in MicroSCADA networks.

The IP addresses of the MicroSCADA Pro base system and workplaces must comply with the addresses of other nodes on the network. Consult the local area network administrator for valid IP addresses and other LAN configuration issues. This document does not include planning guide for TCP/IP networks. You can find these guides from Microsoft or other Internet sites.

2.2.3.**Host names**

During Windows installation:

1. Type the computer name for the NETBIOS protocol so that the computer is recognized on the LAN. The computer's name is not the same as the host name used by TCP/IP. The host name is given during the TCP/IP protocol configuration.
2. Read the computer's host name and IP address by typing: `ipconfig /all` in a Command Prompt window. It is also possible to verify the settings from the Network Tool in the Control Panel.

To be able to use host names in the communication front-end computers, the names to be recognized have to be defined in a host table on the computer. The host table maps the host name to an IP address. On most Windows systems it is at `C:\Windows\System32\Drivers\Etc\Hosts`. An example of a HOSTS file is listed below:

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
# 102.54.94.97 rhino.acme.com # source server
# 38.25.63.10 x.acme.com # x client host
```

The following is an example of a host table. Here each node has two names, one in lower case letters and one in upper case letters. The items in a host table are separated by spaces or tabs.

127.0.0.1	localhost	
10.58.125.45	apassi	APASSI
10.58.125.46	ws1	WS1
10.58.125.47	ws2	WS2
10.58.125.48	fe1	FE1

There are, however, other mechanisms such as DNS that can be used. Consult your network administrator for information on solutions applied to your network.

2.2.4.**Configuring SYS 600 for LAN**

In the base systems connected to a LAN, define a LIN object of LAN. One object is enough for all LAN connections.

```
#CREATE LIN:V = LIST(- ;Link to other SYS or LAN frontend (requires TCP/IP)
    LT = "LAN") ;Link type
#CREATE LIN1:B = %LIN

#CREATE NOD:V = LIST(- ;Node for LAN frontend or SYS
    LI = 1,-
    NN = "10.58.125.131",-
    DI = 10,-
    DT = 30,-
```

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```

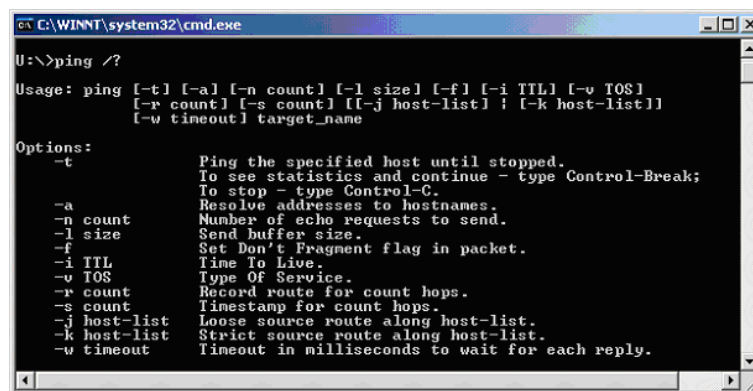
SA = 232)
#CREATE NOD32:B = %NOD

#CREATE NOD:V = LIST (-          ;Node for LAN frontend or SYS
LI = 1,-
NN = "System2",-
DI = 10,-
DT = 30,-
SA = 230)
#CREATE NOD30:B = %NOD

```

2.2.5. Verifying the LAN communication

Use the ping utility to test the connectivity on the LAN and determine if a host is available and active. The syntax is: ping host where 'host' is the computer's IP address or node name on the network. If the computer responds, a message is produced with some diagnostic information.



A070514

Fig. 2.2.5.-1 Testing LAN Connectivity

Example:

```
Ping 192.10.0.210
```

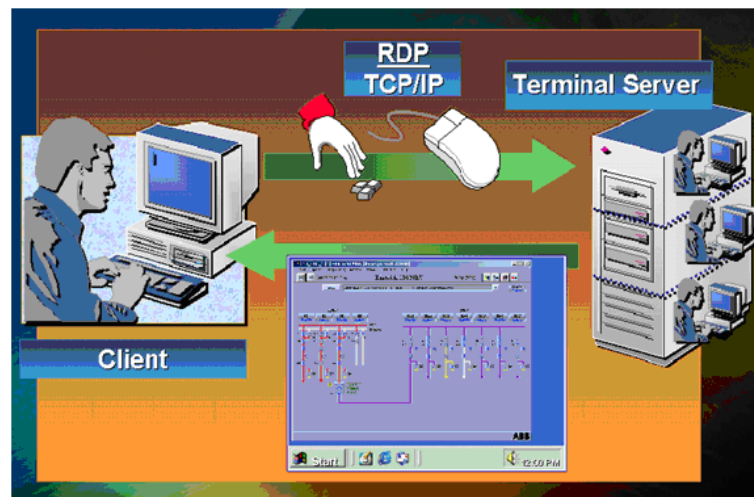
```
Reply from 192.10.0.210: bytes = 32 time < 10ms TTL 255
```

The typical reply time is below 10ms. If the reply time exceeds 50 ms on normal 10/100Mb/s Wired or Fibre Optic Network, it is recommended to check the LAN communication equipment.

2.3. Installing workplaces

2.3.1. Installing Terminal Services

Terminal Services is a component of Microsoft Windows (both server and client versions) that allows a user to access applications and data stored on a remote computer over a network. This feature is needed to be able to open MicroSCADA Pro FrameWindow –type pictures on workstations.



A050195

Fig. 2.3.1.-1 Principles of Terminal Server based computing

Server-based computing

With server-based computing it is possible to deploy, manage, support and execute applications completely on a server. The client devices, whether “fat or thin”, have instant access to it without application rewrites or downloads.

Components of server-based computing

Server-based computing relies on three critical components:

1. A multiuser operating system that allows multiple concurrent users to log on and run applications in separate, protected sessions on a single server.
2. A remote presentation services architecture capable of separating the application's logic from its user interface, in such a way that only keystrokes, mouse clicks, and screen updates travel the network.
3. The Terminal Server product consists of four components: the Windows Server multiuser core, the Remote Display Protocol, the Windows-based client software and enhanced system administration tools.

Terminal Server: A multiuser server core that provides the ability to host multiple, simultaneous client sessions on Windows Server 4.0 (Terminal Server Edition) and on later versions of Windows Server (Windows Server 2000, Windows Server 2003).

Remote Display Protocol (RDP): A key component of Terminal Server is the protocol, which allows a client to communicate with the Terminal Server over the network. It is a multichannel protocol tuned for high-bandwidth enterprise environments. Furthermore, it supports three levels of encryption.

Terminal Server Client: The client software presenting or displaying the 32-bit Windows user interface on a range of desktop hardware.

Administration Tools: In addition to all the familiar Windows Server administration tools, Terminal Server adds the Terminal Server License Manager, Terminal Server Client Creator, Terminal Server Client Connection Configuration and Terminal Server Administration tools for managing the client sessions. There are two new objects, Session and User, which are also added to the Performance Monitor to allow tuning of the server in a multiuser environment.

2.3.2.

Terminal Server system requirements

The Terminal Server system requirements are as follows.

Operating system:

- Microsoft Windows 2000 Server or
- Microsoft Windows Server 2003 Standard Edition

Base Requirements:

- 32-bit x86 microprocessor (such as Intel PentiumIII or higher)
- 1024x768 or higher resolution monitor, 256 colors
- One or more hard disks, with 1GB minimum of free hard disk space
- 256 MB of RAM, plus 10 MB for each typical user who is connecting
- Transmission Control Protocol/Internet Protocol (TCP/IP)
- CD-ROM drive or network access for installation

Processor and Memory Requirements:

Processor and memory requirements scale linearly up to four processors. The maximum memory supported is 4 GB.

Other Peripherals:

Hard disk throughput also affects the performance of the system. For the highest disk performance, consider using a SCSI RAID controller. The RAID (Redundant Array of Independent Disks) controllers place data on multiple disk drives automatically and can therefore increase disk performance and improve data reliability.

Although the Remote Desktop Protocol used with Terminal Server causes negligible network load, a high-performance network interface card (NIC) is recommended. This is particularly important, if many users require access to data stored on network servers or run client/server applications.

If a multiport asynchronous communications adapter is installed for supporting dial-in users, be sure to use an intelligent (microprocessor-based) adapter to reduce interrupt overhead and increase throughput.

Client System:

Installation and Administration Manual

A Terminal Server Client can be used on a client PC to access a Terminal Server using the TCP/IP protocol from a network or by connecting via a Remote Access Service (RAS) connection.

The minimum requirements for the 32-bit Terminal Server Client are:

- Personal computer with an x86 compatible processor, Pentium or higher.
- The Client is available on any Windows operating system. It is included or can be downloaded to older Windows versions.
- 1024x768 or higher resolution video adapter, min. 256 colors.
- Network interface card (NIC) using the Microsoft TCP/IP protocol.
- Microsoft serial mouse or 100 percent compatible.



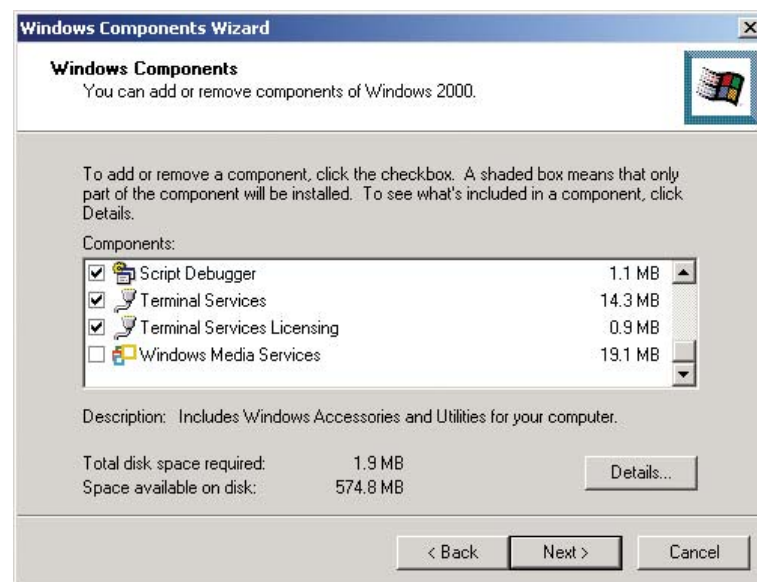
Windows XP or Windows 2000 Professional does not contain Terminal Services, but only the RDP Client. Terminal Services is a feature of Windows 2000/2003 Servers.

2.3.3.

Licensing service installation

To install the license service:

1. Choose Terminal Server Licensing during product setup, or at any time click the **Add or Remove Programs** icon on Control Panel.
2. Click **Add/Remove Windows Components**.



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Fig. 2.3.3.-1 Add/Remove Components, Terminal Services Licensing

In Windows Server 2003, the licensing service can be installed on a workgroup based server, a member server or a domain controller.

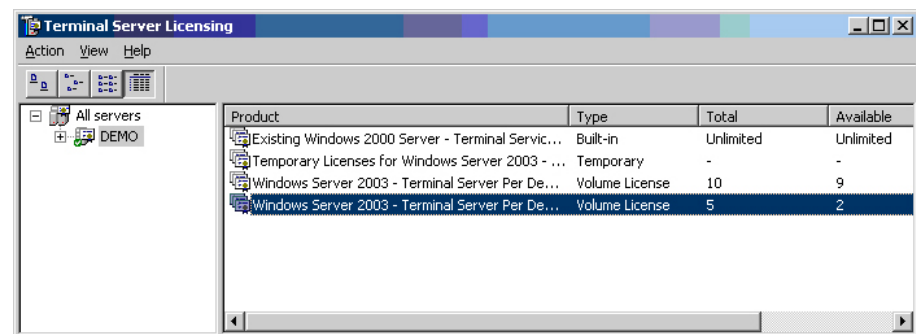
During the installation of the Terminal Server Licensing service, you need to choose between the following modes of the license server:

- Your entire enterprise (enterprise license server)
- Your domain or workgroup (domain/workgroup license server)

Normally, your domain or workgroup is used. In this scenario, a license server is automatically discovered by any terminal server within the same subnet as the license server.

License installation

License tokens must be installed on your license server in order to deploy them to client devices. After you have purchased Terminal Service Client Access Licenses (TS CAL)s, you can then install the corresponding license tokens by using the CAL Installation Wizard, which is located in the Terminal Server Licensing tool.



A070706.

Fig. 2.3.3.-2 Terminal Services Licensing

For more information, see the Microsoft Terminal Server Licensing document.

Activating license

A license server must be activated in order to certify the server and allow it to issue client license tokens. A license server is activated using the Activation Wizard in the Terminal Server Licensing administration tool. To activate a license server, select **Action > Activate Server** while the server is highlighted.

There are three connection methods to activate your license server:

- **Internet (Automatic):** The quickest and easiest way to activate and install licenses, which is also recommended by Microsoft. This method requires Internet connectivity from the device running the Terminal Server Licensing admin tool. Internet connectivity is not required from the license server itself. The internet method uses TCP/IP (TCP port 443) to connect directly to the Clearinghouse.
- **Web:** The Web method should be used when the device running the Terminal Server Licensing admin tool does not have internet connectivity, but you do have access to the Web by means of a Web browser from another computer. The URL for the Web method is displayed in the Activation Wizard.
- **Phone:** The phone method allows you to talk to a Microsoft Customer Service Representative to complete the activation or license installation transactions. The appropriate telephone number is determined by the country/region you choose in the Activation Wizard and is displayed by the wizard.

A license server must be activated only once. While waiting to complete the activation or license token installation processes, your license server can issue temporary tokens for clients that allow Terminal Server Licensing.

Purchasing license

The process for purchasing TS CALs for Windows Server 2003 remains the same as for purchasing other Microsoft Client Access licenses. Customers might purchase these licenses by obtaining a Microsoft License Pack (MLP), Microsoft Open License, or through one of Microsoft's volume licensing programs, such as Microsoft Select.

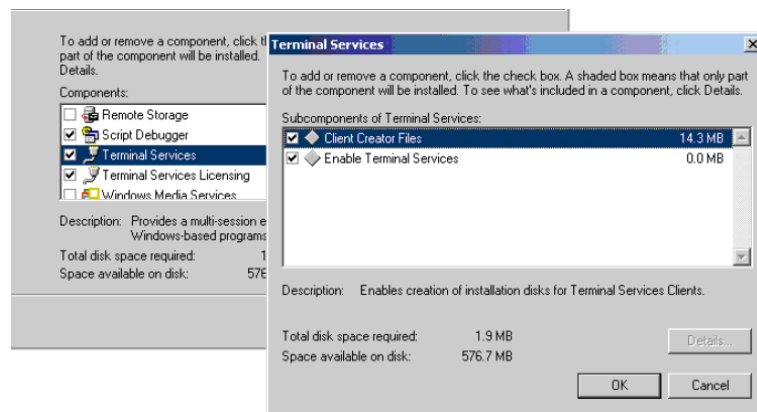
2.3.4.

Installing Windows 2000/2003 Terminal Services

To install Windows 2000/2003 Terminal Services:

1. Open the Control Panel.
2. Double-click the **Add/Remove Programs** icon. The Add/Remove Programs dialog is displayed.
3. Click **Add/Remove Windows Components** on the left pane. The Windows Components Wizard is displayed.
4. Scroll down the list to find Terminal Services and choose it by selecting a check box on the left of it. If you click Details, you will see that there are two sub-components:
 - Client Creator Files
 - Enable Terminal Services. See Fig. 2.3.4.-1.

Installation and Administration Manual



A050088

Fig. 2.3.4.-1 Subcomponents of Terminal Services dialog

5. The next dialog informs you to install Terminal Services to run in one of the two modes:

- Remote Administration or
- Application Server.

The Application mode is required. This also requires the Terminal Services Licensing service to be installed. A Terminal Services Client Access License is also required for non-Windows 2000 Professional clients.

6. After selecting the mode, click **Next** to continue.

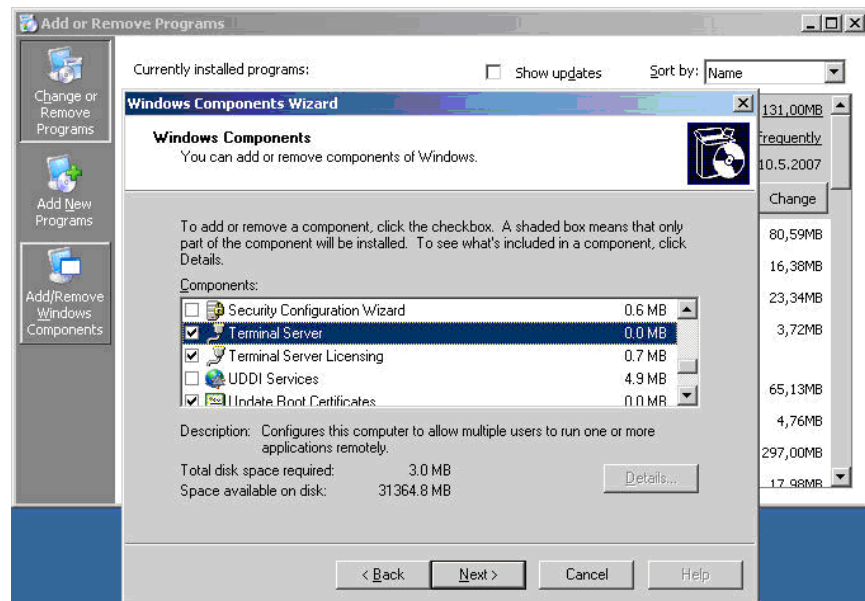
The following two dialogs concern the applications. In the first dialog, you can determine how much you would like to restrict the users from accessing the registry. Some applications store user settings in the registry, and will therefore need more permission to it than others.

7. Select Windows 2000 Users. A warning dialog may appear even if everything is done correctly. After that, the file copying progress dialog is displayed.
8. Click **Finish** to finish the installation.
9. Restart the computer.

Windows Server 2003

When you install Windows Server 2003, you are not prompted to install Terminal Services. You can only enable or disable connections to the computer.

You can use **Add or Remove Programs** to install Terminal Server.



A070708

Fig. 2.3.4.-2 Installing Terminal Services

Terminal Server Licensing is a required component that licenses clients on a terminal server. You must install Terminal Server Licensing or your terminal server will stop accepting connections from unlicensed clients 120 days from the date of the first client logon. For small deployments, it is acceptable to install both the Terminal Server and Terminal Server Licensing service on the same physical computer. For larger deployments, it can be installed on a separate server.

Managing Terminal Services Users

Each user who logs on to a Terminal Services session must have a user account either on the server or in a domain on the network that the server is on. The Terminal Services user account contains additional information about the user.

Windows Server 2003 family operating systems contain a built-in User group called Remote Desktop Users, which is used to manage Terminal Services users.

When you install one of the Windows Server 2003 operating systems, the Remote Desktop Users group is one of the built-in user groups on your computer. Members of this group have the same access as members of the Users group, but they have the additional ability to log on remotely to the computer. By default, this group is not populated when you install Terminal Server. You must choose the users and groups that you want to have permission to log on remotely to the terminal server, and manually add them to the Remote Desktop Users group.

To add users to the Remote Desktop Users group:

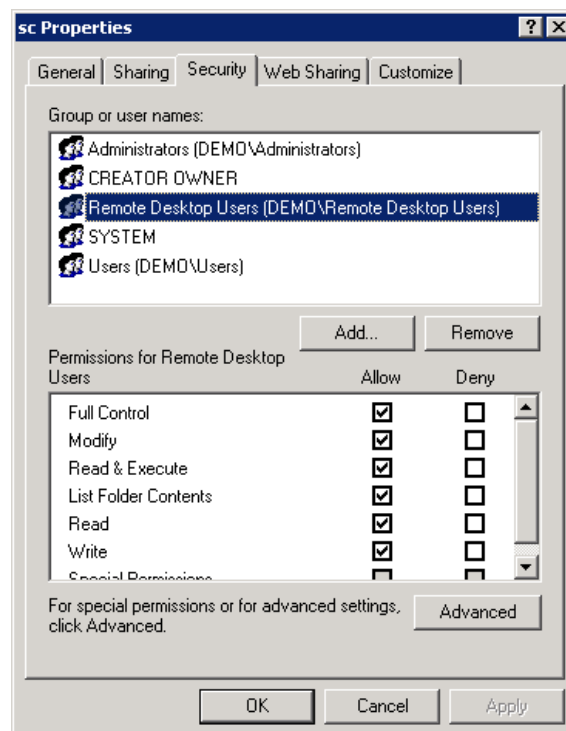
1. Open Computer Management.
2. In the console tree, click the Local Users and Groups node.
3. In the details pane, double-click the Groups folder.
4. Double-click Remote Desktop Users, and then click **Add**.

5. On the Select Users dialog box, click **Locations** to specify the search location.
6. Click **Object Types** to specify the types of objects you want to search for.
7. Type the name you want to add in the Enter the object names to select (examples) : box.
8. Click **Check Names**.
9. When the name is located, click **OK**.



In the server computer, client users were previously granted Administrator rights to get access to the MicroSCADA and its related tools from the client computer. The following now describes an alternative solution.

By default, a Remote Desktop Users group is available in the operating system. The client login names should be defined to belong to this Remote Desktop Users group. After this, the rights to Modify Access to the MicroSCADA directory, i.e.<drive>\sc should be granted.



A070740

Fig. 2.3.4.-3 Access rights for MicroSCADA users

2.3.5.

Installing Terminal Server Client

Windows 2000

There are two methods to install the Terminal Server Client.

The Client Creator can be used to create disks for installing the client software on a user's computer. You can use these disks to distribute the appropriate Terminal Services Client to each user.

One of the directories created in Terminal Services installation is WINNT\system32\clients\tsclient.

By sharing this directory as read-only, you can install the Terminal Server Client over the network without using discs. This is done simply by running setup.exe from the net\win32 directory.

Windows Server 2003/XP Professional computers

The Client is installed as default.

The Terminal Services Client, called the Remote Desktop Connection (RDC), provides substantial improvements over previous releases, including greater functionality through a simplified user interface.

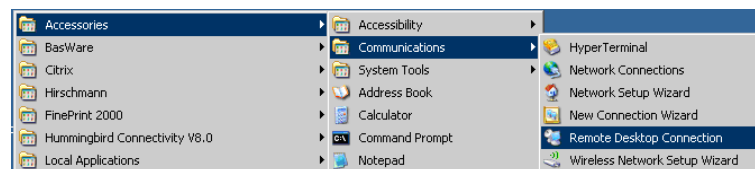
Remote Desktop Connection for Windows XP (Terminal Services Client 6.0) is available from Microsoft site (see KB925876). This will give some new useful features, for example, it is possible to use large two monitor displays on workstations.

This version of Remote Desktop Connection (Terminal Services Client 6.0) can be installed on client computers running Windows XP Service Pack 2. It can be used to connect to terminal servers or remote desktops running earlier versions of Windows, but the new features are available only when the remote computer is running Windows Vista or Windows Server, code name "Longhorn."

2.3.6.

Remote Display Protocol (RDP) Client

To open the Remote Desktop Connection (RDP) Client select **Startup > Accessories > Communications > Remote Desktop Connection**. See Fig. 2.3.6.-1 below.



A051130

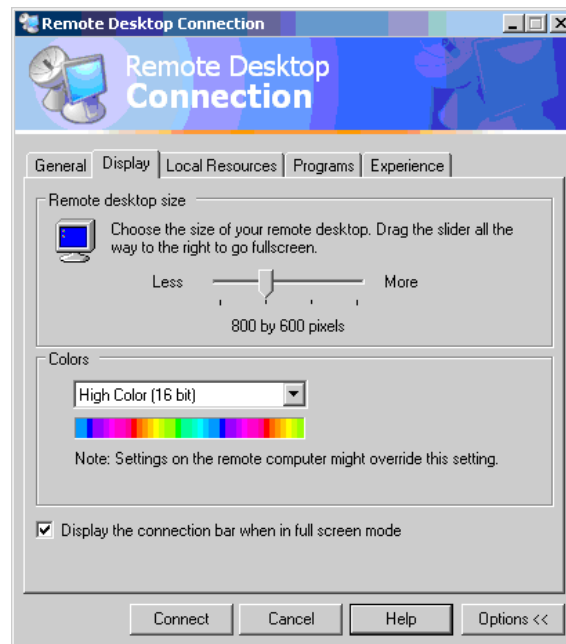
Fig. 2.3.6.-1 Opening the Remote Desktop Connection

Customizing the Remote Connection

To change the various options for configuring the remote connection, a property sheet with tabs shows the controls for

- Display
- Local Resources
- Programs to run on connection
- Other Experience settings

See Fig. 2.3.6.-2



A070515

Fig. 2.3.6.-2 Remote Desktop Connection Display

2.4.

Citrix MetaFrame Application Server

2.4.1.

Introduction

MetaFrame Application Server for Windows is Citrix's thin client/server system software for Microsoft's Windows Terminal Server. MetaFrame thin client/server system software incorporates Citrix's Independent Computing Architecture (ICA) protocol.

Latest version tested with MicroSCADA Pro is called Citrix MetaFrame Presentation Server 4.0. Installing MetaFrame will not interfere with the functions of a computer running Terminal Server. This means that clients can connect and execute programs on the server regardless of whether they are running the Citrix ICA protocol, or the standard Terminal Server client using RDP. The main differences are in the features each protocol and its respective clients support.



Install MetaFrame Presentation Server after installing the Terminal Services.

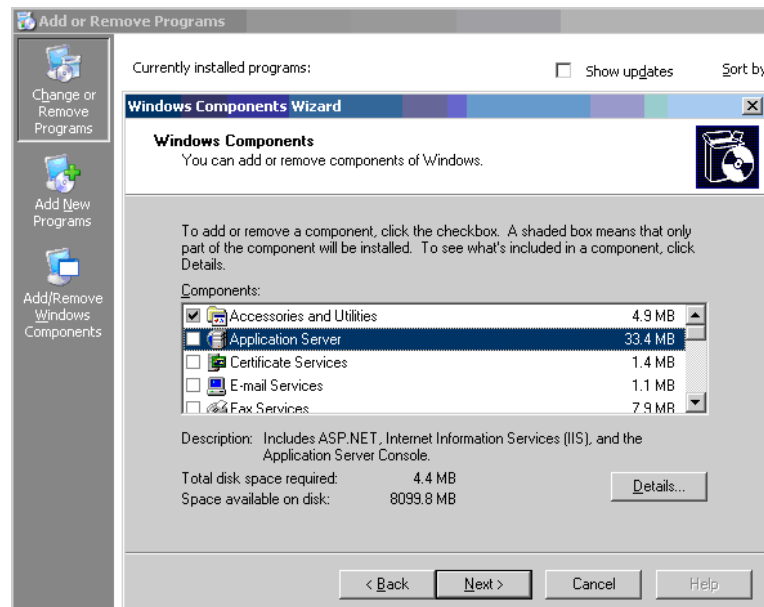
2.4.2.**System requirements**

- Microsoft Windows 2000 Server and Service Pack 4.0 (or later) or
- Microsoft Windows Server 2003 and Windows Server 2003 SP1
- Microsoft NET Framework version 1.1
- Java Runtime Environment (JRE) version 1.4.1_02 (or later)
- ASP.NET (Microsoft component)

2.4.3.**Installing Citrix MetaFrame Presentation Server 4.0 system****2.4.3.1.****Windows components installation**

To install the Windows component:

1. From the Control Panel, go to **Add or Remove Programs** and select **Add or Remove Windows Components**.

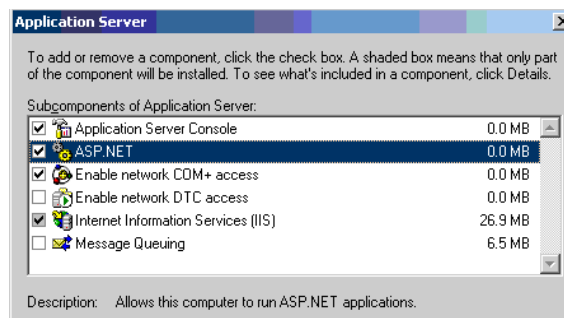


A070516

Fig. 2.4.3.1.-1 Windows Component Wizard

2. Select Application Server and click **Details**.
3. Select Application Server Console, if not yet checked and ASP.NET.

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A070517

Fig. 2.4.3.1.-2 Application Server dialog

4. Click **OK** in the Application Server dialog and click **Next** in the Windows Components Wizard.
5. Click **Finish**.

2.4.3.2.

Get Citrix license file from internet

1. Go to <http://mycitrix.com>. The Citrix Login page is displayed.

MyCitrix Login

Enter your login ID and password below. Select 'New User' to create a new account or 'Forgot Your Password' for a reminder.

* Login ID:

* Password:

 **LOGIN**

 [Forgot Your Password?](#)
 [New User?](#)
 [Find Your Company Account](#)
 [Find Your Business Contact](#)
 [Citrix Employee? Login to MyCitrix](#)

A070518

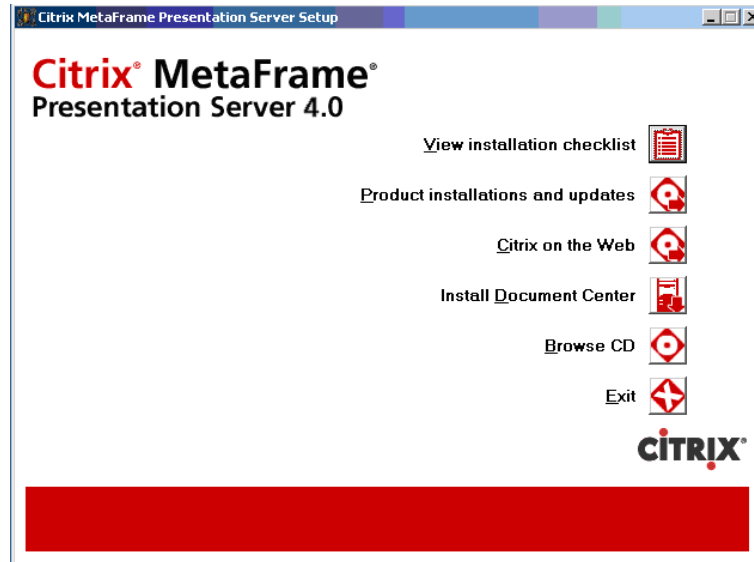
Fig. 2.4.3.2.-1 Citrix Login Window

2. Type Login ID, Password and click **Login**.
3. Click **Licensing**.
4. Click **Citrix Activation System (CAS)**.
5. Click **Activation of licenses**. Follow the rules for Citrix License Activation.

2.4.3.3.

Installation and configuration of MetaFrame Access Suite licensing

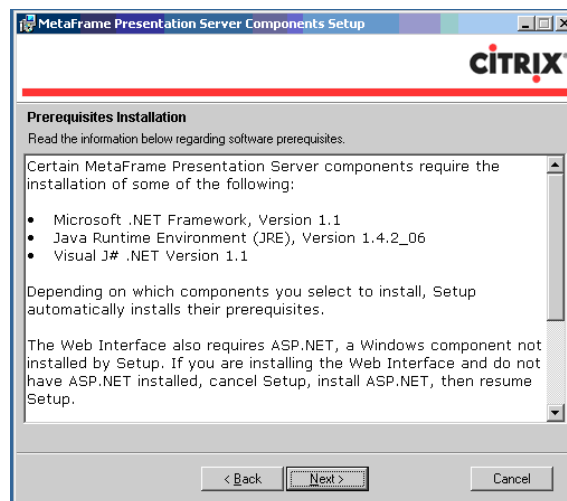
1. Install Citrix Presentation server CD in a SYS 600 PC.



A070519

Fig. 2.4.3.3.-1 Citrix MetaFrame Presentation Server setup

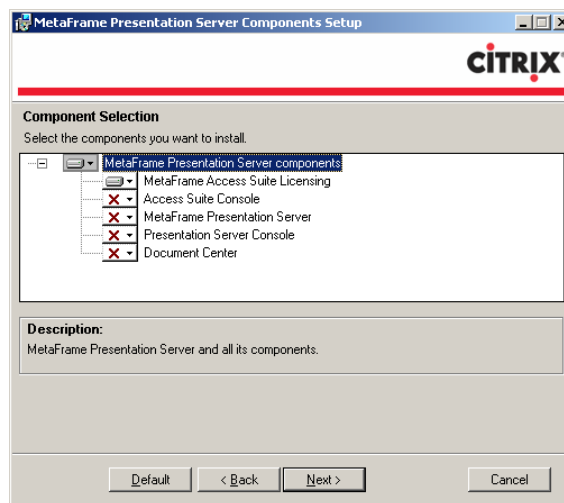
2. Select **Product installations and updates**. Then select **Install MetaFrame Access Suite licensing**, click **Accept** and next select **Prerequisites Installation** and click **Next**.



A070520

Fig. 2.4.3.3.-2 Prerequisites installation

3. Click **Next**.



A070521

Fig. 2.4.3.3.-3 Component selection

4. Click **Next**.

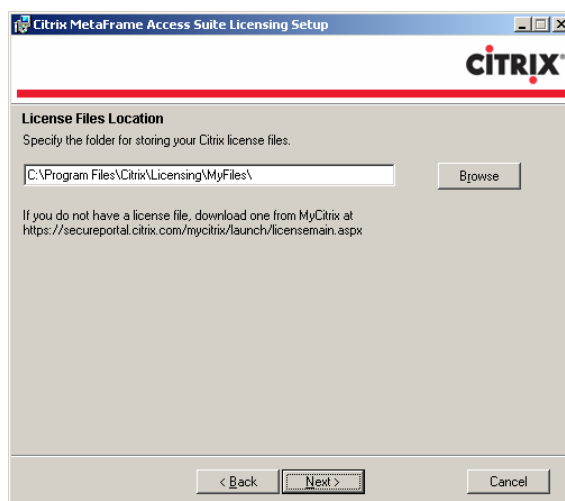


A070522

Fig. 2.4.3.3.-4 Citrix MetaFrame Access Suite licensing setup

5. Click **Next** and then accept **Destination Folder** by clicking **Next**. Accept the selected features and click **Next**.

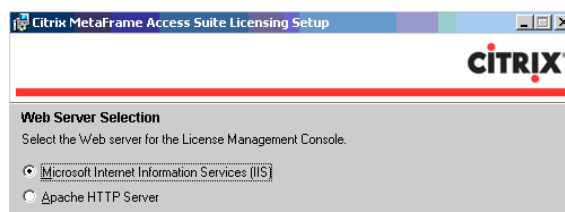
Installation and Administration Manual



A070523

Fig. 2.4.3.3.-5 License files location

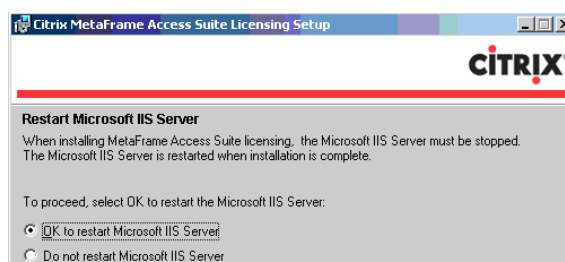
6. In the **License Files Location**, copy your license file in SYS 600 to c:\Program Files\Citrix\Licensing\MyFiles\



A070524

Fig. 2.4.3.3.-6 Web Server selection

7. Select **Next**.



A070525

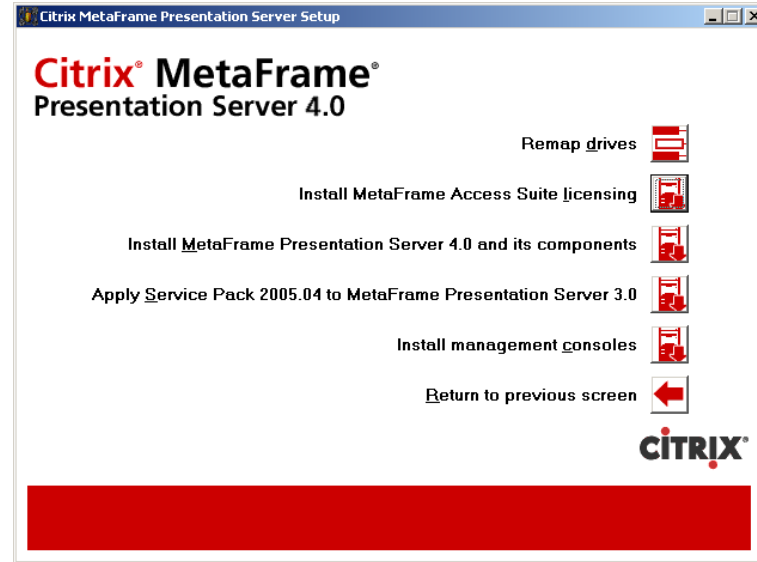
Fig. 2.4.3.3.-7 Restart server dialog

8. Click **Next** and then **Finish**.

2.4.3.4.

Install MetaFrame Presentation Server 4.0 and its components

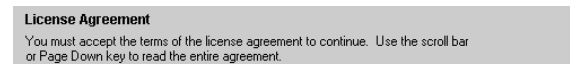
1. Click **Install MetaFrame Presentation Server 4.0 and its components** as shown in the figure below.



A070526

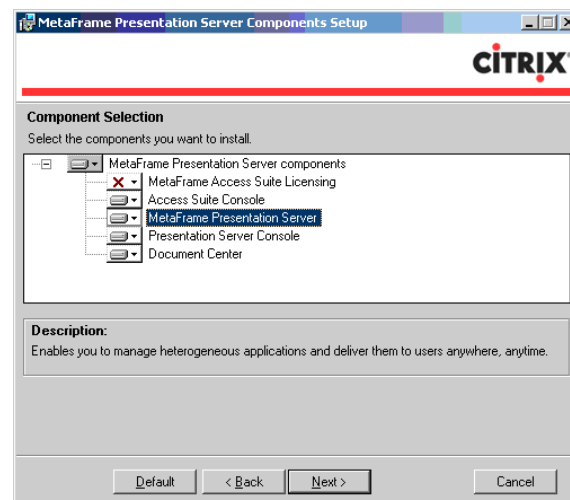
Fig. 2.4.3.4.-1 MetaFrame Presentation Server and components installation dialog

2. Accept the license agreement and continue.



A070527

Fig. 2.4.3.4.-2 License agreement

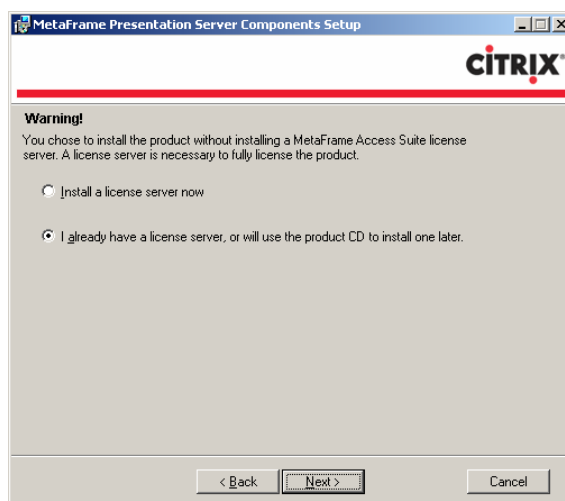


A070528

Fig. 2.4.3.4.-3 Component Selection for MetaFrame Presentation Server

3. Click **Next**.

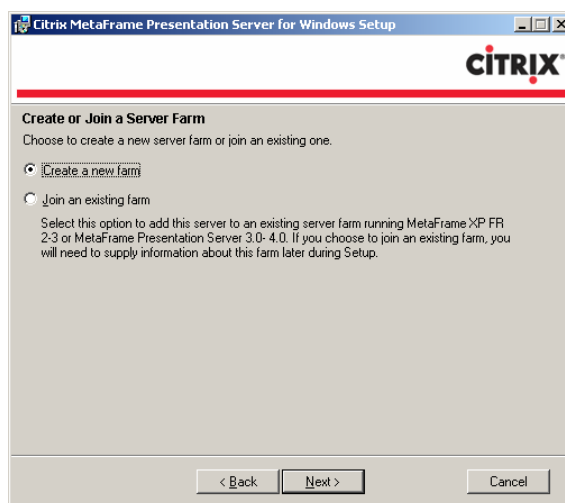
Installation and Administration Manual



A070529

Fig. 2.4.3.4.-4 Warning dialog

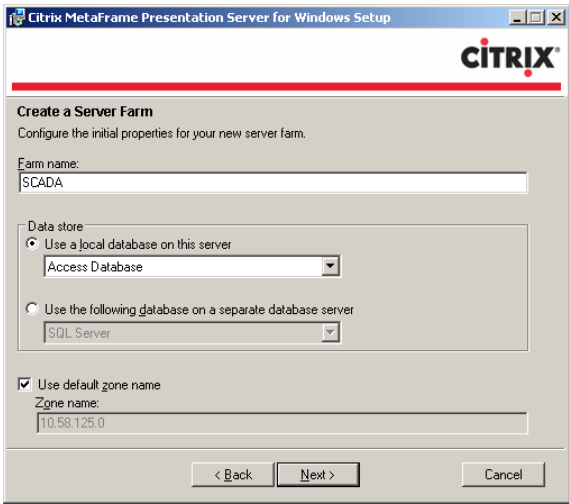
4. Follow the Components Setup messages. In most cases there is no need change default setup.
5. The following is an example setting when joining a Farm.



A070530

Fig. 2.4.3.4.-5 Server farm window

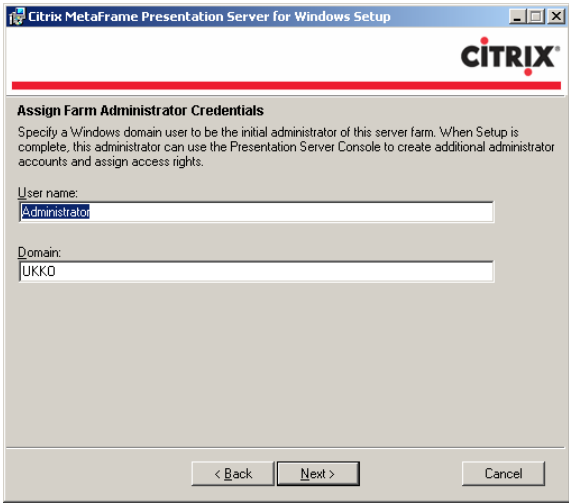
Farm name: SCADA



A070531

Fig. 2.4.3.4.-6 Create Server farm window

6. Click **Next**.

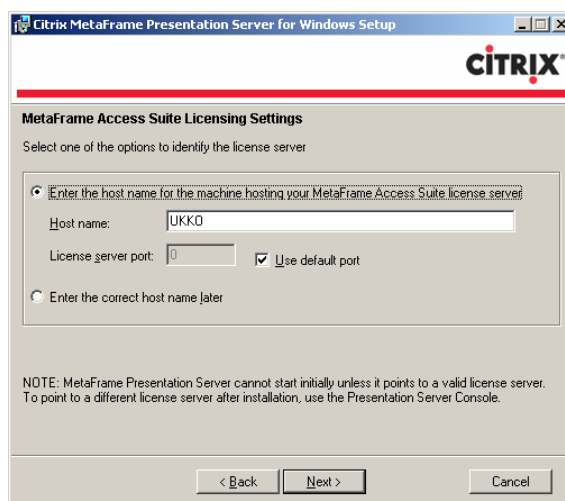


A070532

Fig. 2.4.3.4.-7 Assigning credentials

7. Click **Next**.

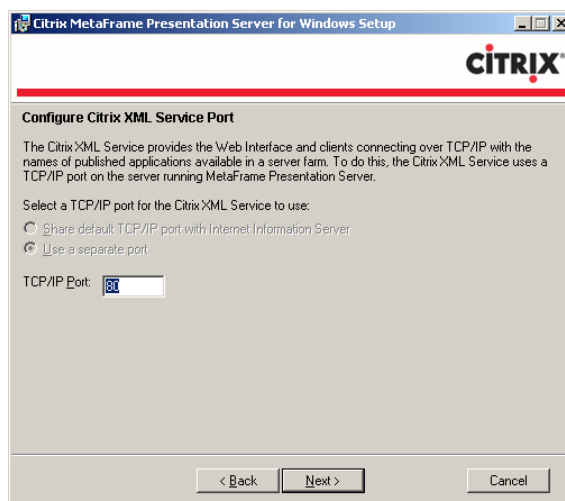
Installation and Administration Manual



A070533

Fig. 2.4.3.4.-8 Licensing settings

8. Click **Next**.

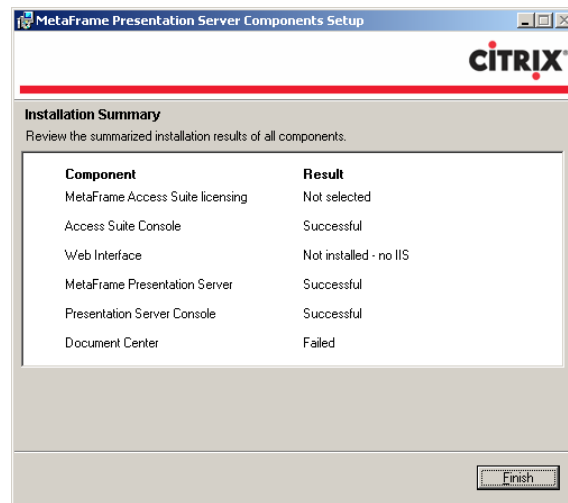


A070534

Fig. 2.4.3.4.-9 Configuring Citrix XML Service Port

The installation summary is displayed at the end.

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A070535

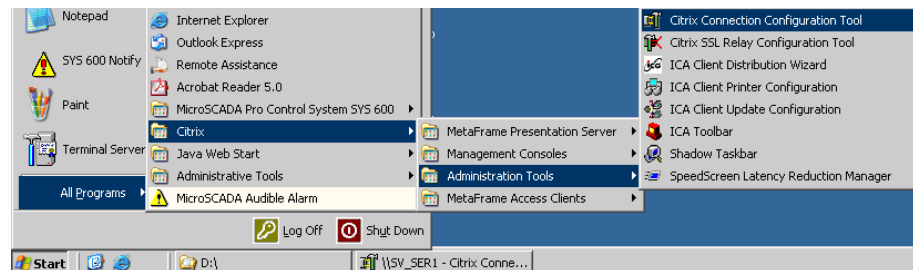
Fig. 2.4.3.4.-10 Installation summary window



Citrix will set Only Launch Published Applications selection on both connection types, ICA and RDP. Installing Citrix MetaFrame affects also Terminal Services RDP! You have to deselect Only Launch Published Applications.

To do so:

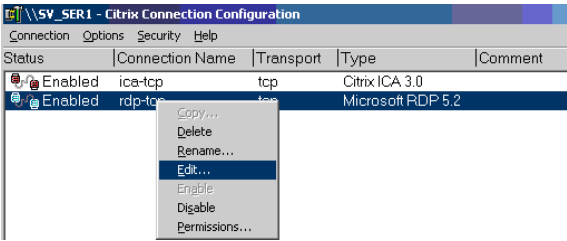
1. Go to **All Programs -> Citrix -> Administration Tools -> Citrix Connection Configuration Tool**



A070536

Fig. 2.4.3.4.-11 Citrix Client configuration tool

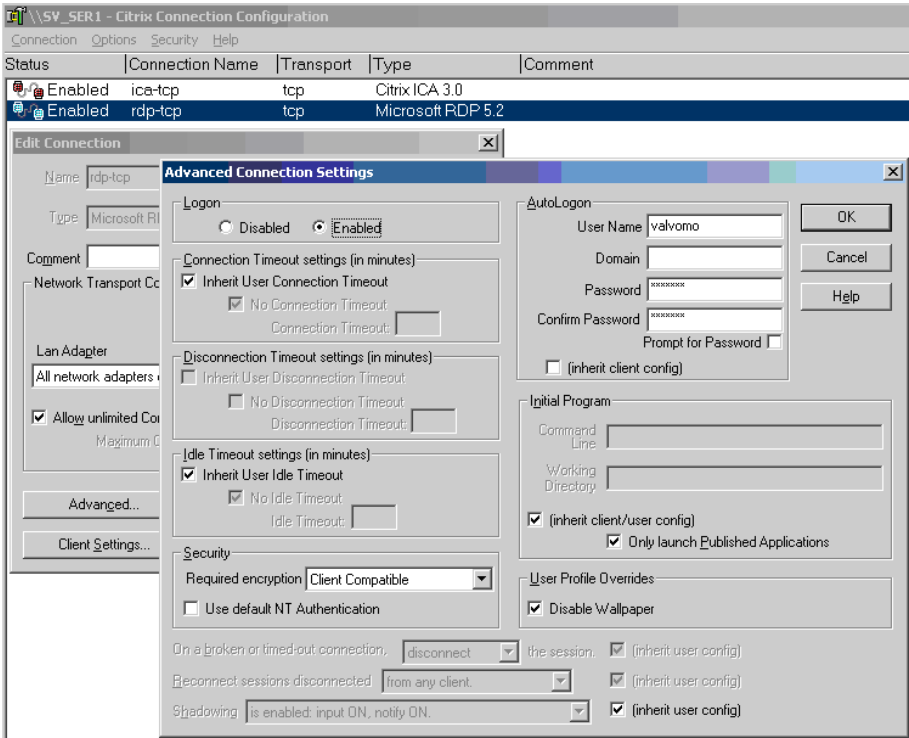
2. In the Citrix Connection Configuration, right click “..rdp-tcp..” and click **Edit**.



A070537

Fig. 2.4.3.4.-12 Citrix Connection Configuration

3. Deselect Only Launch Published Applications. Do the same procedure for ica-tcp also.



A070538

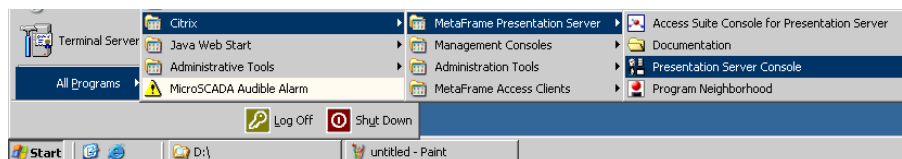
Fig. 2.4.3.4.-13 Advanced connection settings

2.4.4. Publishing applications

It is MetaFrame Presentation Server's integral function to make applications and their content available to users. If you are logged into a certain server farm, use Presentation Server Console to publish applications on any server in the server farm. You do not have to run Presentation Server Console from the same MetaFrame Presentation Server, where the applications are installed. The server or servers, that host the published applications, has to be a server farm member.

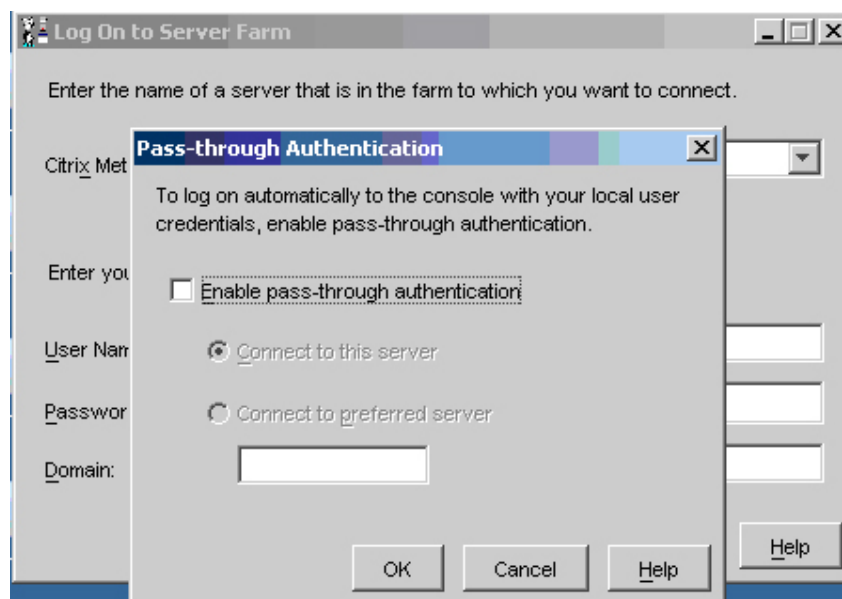
To publish an application:

1. Open the Presentation Server console.



A070720

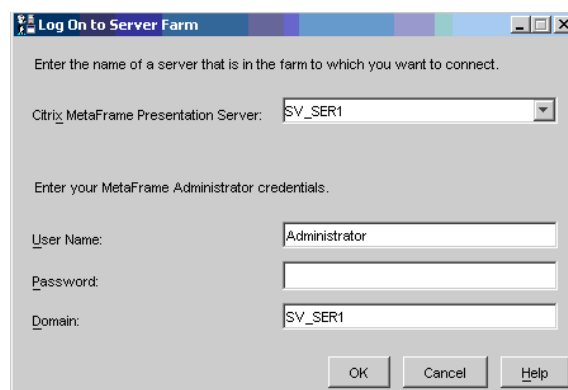
Fig. 2.4.4.-1 Launching Presentation Server console



A070721

Fig. 2.4.4.-2 Authentication window

2. Click **Cancel**.

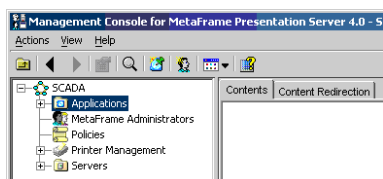


A070722

Fig. 2.4.4.-3 Logon window

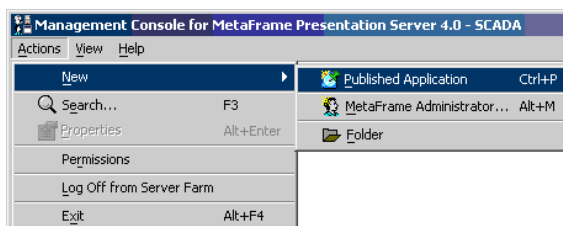
3. Enter Password and click **OK**.

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A070723

Fig. 2.4.4.-4 Selecting applications

4. Select **Applications**.

A070724

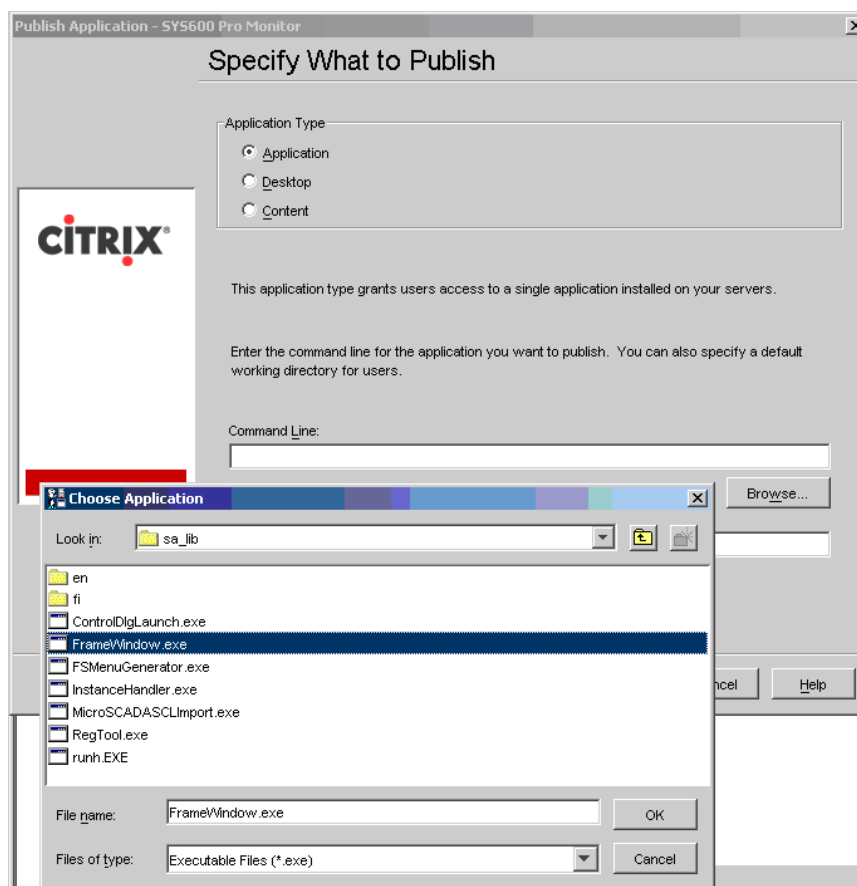
Fig. 2.4.4.-5 Selecting published applications

5. Select **Actions > New > Publish Application**.

A070725

Fig. 2.4.4.-6 Publishing wizard

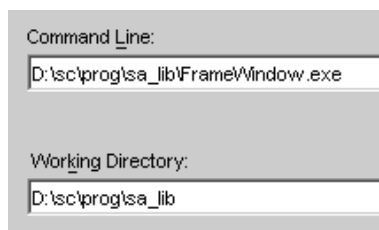
6. Define the display name and application description and click **Next**.



A070726

Fig. 2.4.4.-7 Selecting application dialog

7. Browse to “FrameWindow.exe”



A070727

Fig. 2.4.4.-8 Command line

8. Click **Next**.

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Program Neighborhood Settings

These settings control application launching in Program Neighborhood. You can specify a folder to contain the application's icon, and push application shortcuts to Start menus and desktops of clients.

Program Neighborhood Folder:
Pro Monitor

Application Shortcut Placement

☐ Add to the client's Start Menu

☐ Place under Programs folder (Program Neighborhood Agent only)

Start Menu Folder (Program Neighborhood Agent only):

☐ Add shortcut to the client's desktop

Application Icon

Icon:  [Change Icon...](#)

A070728

Fig. 2.4.4.-9 Program neighborhood settings

9. Click **Next**.

Specify Application Appearance

These settings control the application appearance in ICA sessions. Select the window size, number of colors, and startup settings.

Session Window Size:
Full Screen

Colors:
256 colors

Application Startup Settings

☐ Hide application title bar

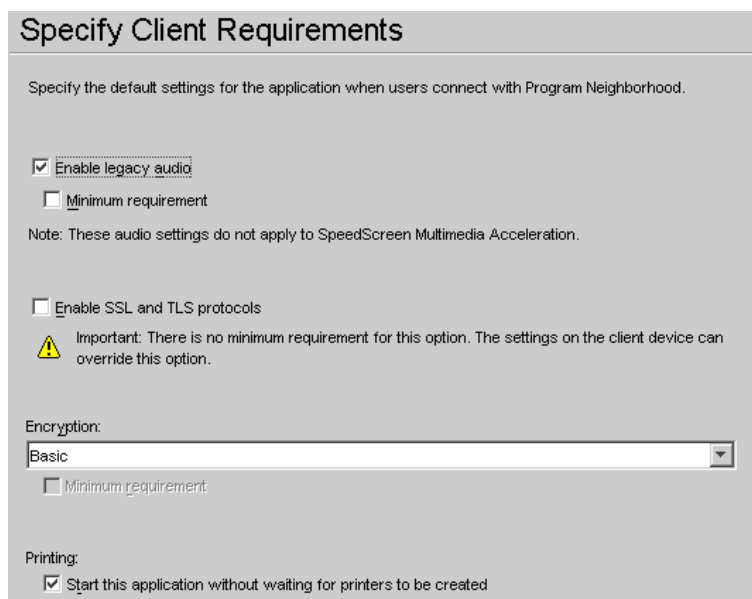
☒ Maximize application at startup

Note: Startup settings are ignored in seamless mode ICA sessions.

A070729

Fig. 2.4.4.-10 Application appearance

10. Click **Next**.



Specify Client Requirements

Specify the default settings for the application when users connect with Program Neighborhood.

☒ Enable legacy audio
☐ Minimum requirement

Note: These audio settings do not apply to SpeedScreen Multimedia Acceleration.

☐ Enable SSL and TLS protocols

 Important: There is no minimum requirement for this option. The settings on the client device can override this option.

Encryption:
Basic

☐ Minimum requirement

Printing:
☒ Start this application without waiting for printers to be created

A070730

Fig. 2.4.4.-11 Client requirements

11. Click **Next**.

Configure Access Control

☒ Allow connections made through MetaFrame Secure Access Manager (version 4.0 or later)

☒ Any connection
☐ Any connection that meets any of the following filters

▲ Farm Name	Filter

Add... Edit... Remove

☒ Allow all other connections

A070731

Fig. 2.4.4.-12 Configuring access control

12. Click **Next**.

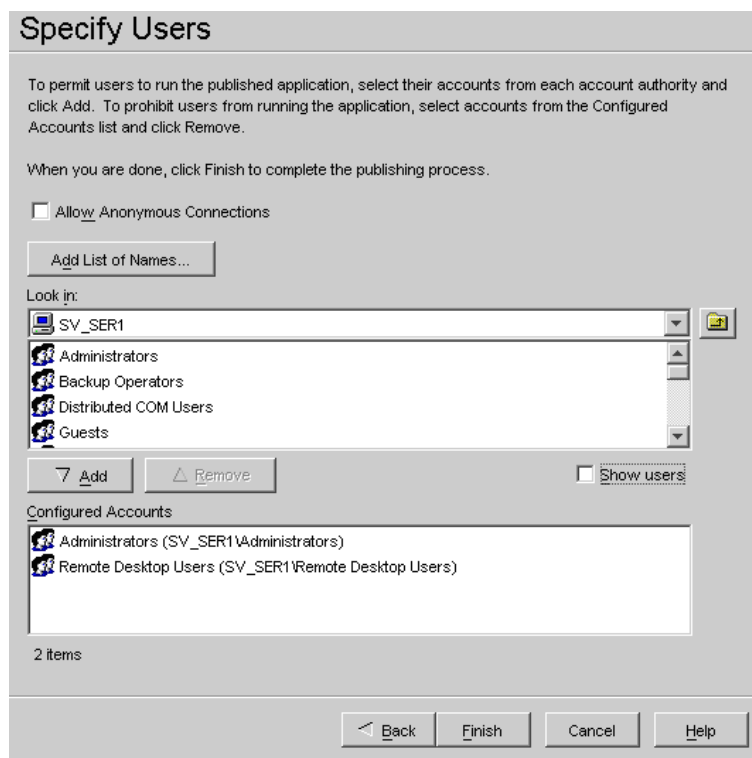
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A070732

Fig. 2.4.4.-13 Specifying servers

13.Add server and click **Next**.



A070733

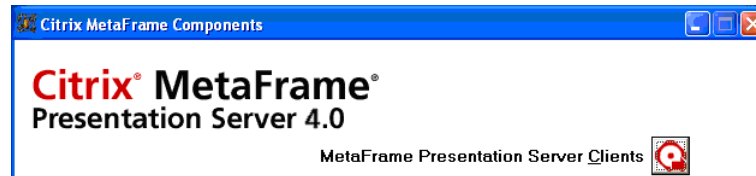
Fig. 2.4.4.-14 Specifying users

14.Click **Finish** and exit from the Management Console.

2.5. ICA Workstation Installation

2.5.1. Installation of “Program Neighborhood”-Client

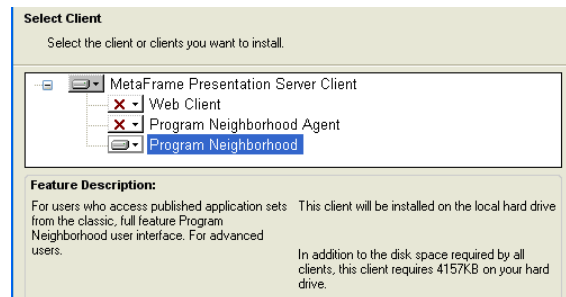
1. Install Citrix Presentation server CD (Components Disk) to Workstation.



A070715

Fig. 2.5.1.-1 Citrix MetaFrame Presentation Server Clients

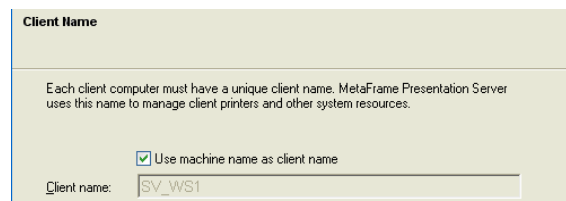
2. Select **MetaFrame Presentation Server Clients**.
3. Select **Install MetaFrame Presentation Server Client for Windows**, next accept License Agreement and continue.



A070716

Fig. 2.5.1.-2 Selecting client

4. Click **Next**.

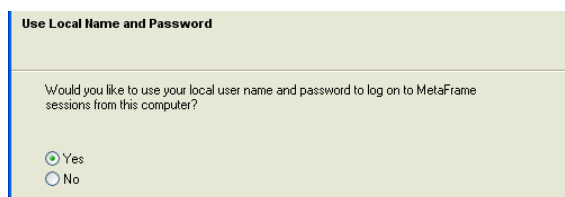


A070717

Fig. 2.5.1.-3 Entering client name

5. Click **Next**.

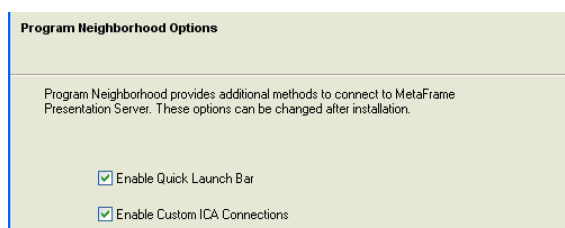
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A070718

Fig. 2.5.1.-4 Using Local Name and Password

6. Click **Next**.



A070719

Fig. 2.5.1.-5 Program Neighborhood Options

7. Click **Next** to begin installation. After successful installation, click **Finish**.

2.5.2.

Adding a new Application Set

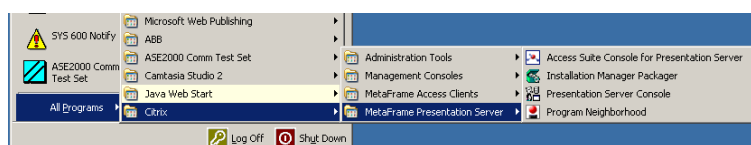
A basic ICA client limits the connection type choices to just custom ICA connections.

With custom ICA desktop or application, the user connects to the Citrix server and receives either a full desktop on the server or runs a particular published application.

With the full version of the Citrix ICA client, you will get Program Neighborhood functionality. The Citrix Program Neighborhood enables to make a connection to a published application set. By setting up an application set, a user sees a set of application icons based on what applications are published for him.

To access published application “FrameWindow.exe” from the workstation:

1. Browse to Program Neighbourhood and doubleclick.

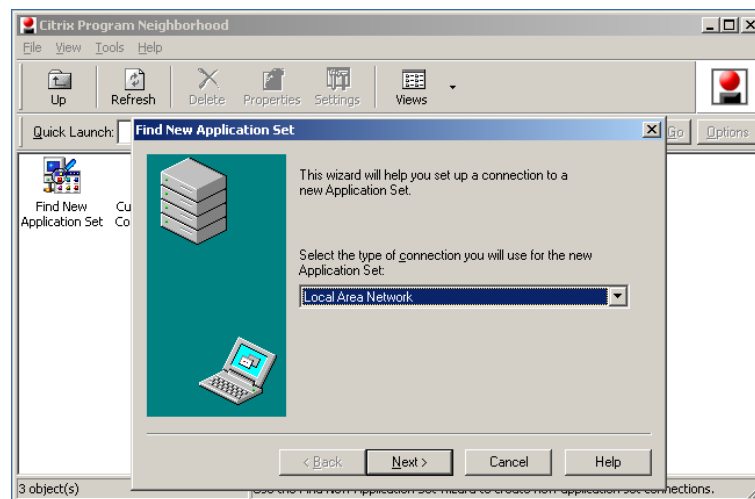


A070539

Fig. 2.5.2.-1 Start Menu

2. Select **Find New Application Set**.

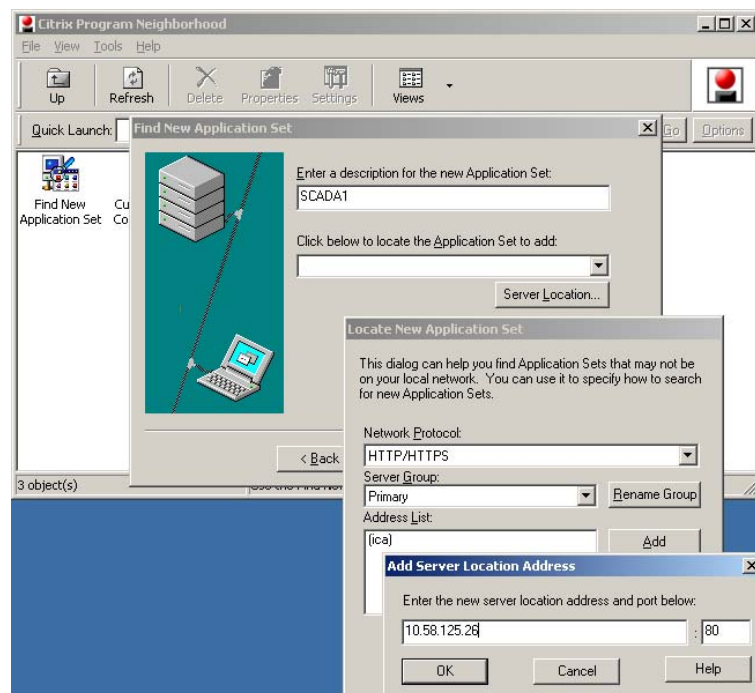
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A070540

Fig. 2.5.2.-2 Find new application set

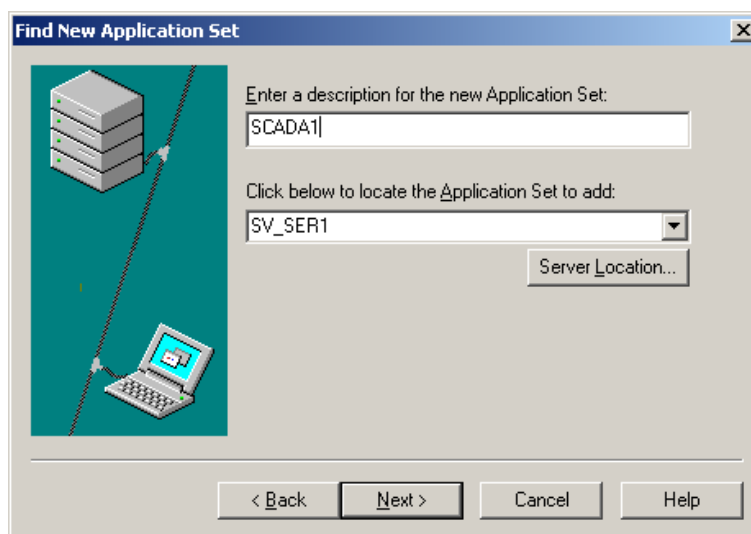
3. Click **Next**.
4. Type the name **SCADA1**, click **Server Location**, add address and click **OK**.



A070541

Fig. 2.5.2.-3 New application set

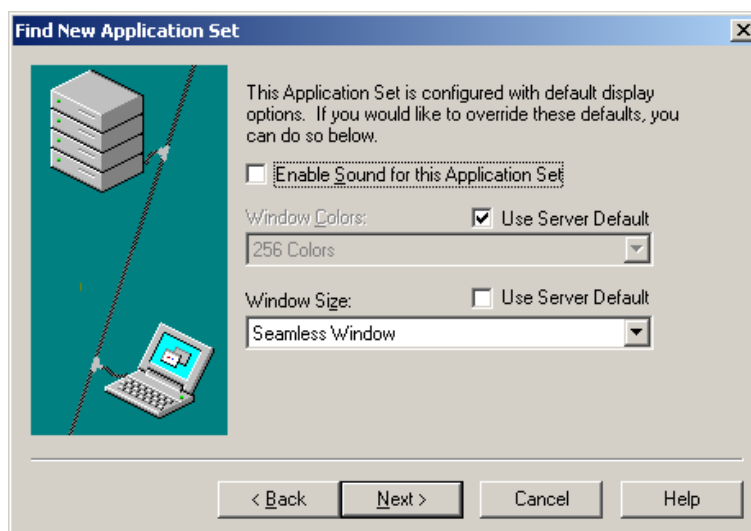
5. Select the name of server from the drop-down list. Note that MicroSCADA Pro is running on SV_SER1.



A070542

Fig. 2.5.2.-4 Locating

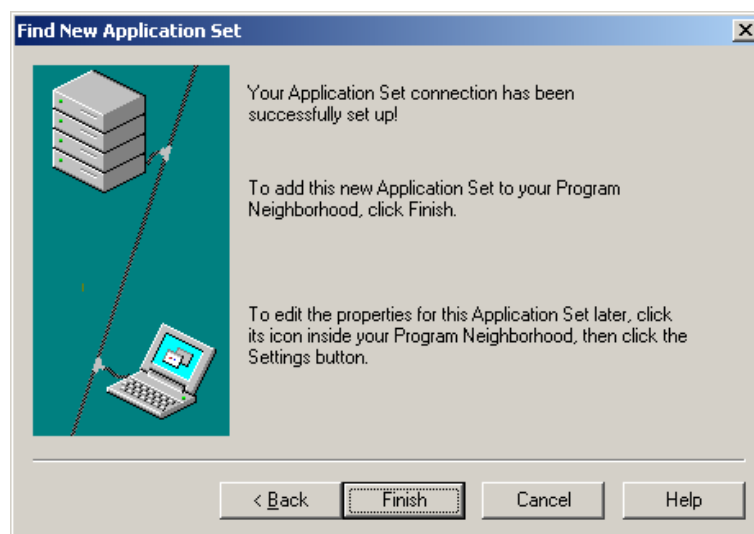
6. Click **Next**.



A070543

Fig. 2.5.2.-5 Customizing settings

7. Click **Next**.

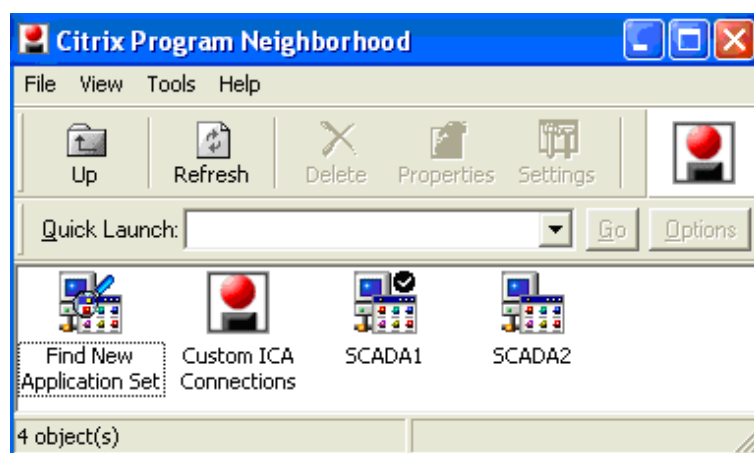


A070544

Fig. 2.5.2.-6 Setup successful message

8. Click **Finish**.

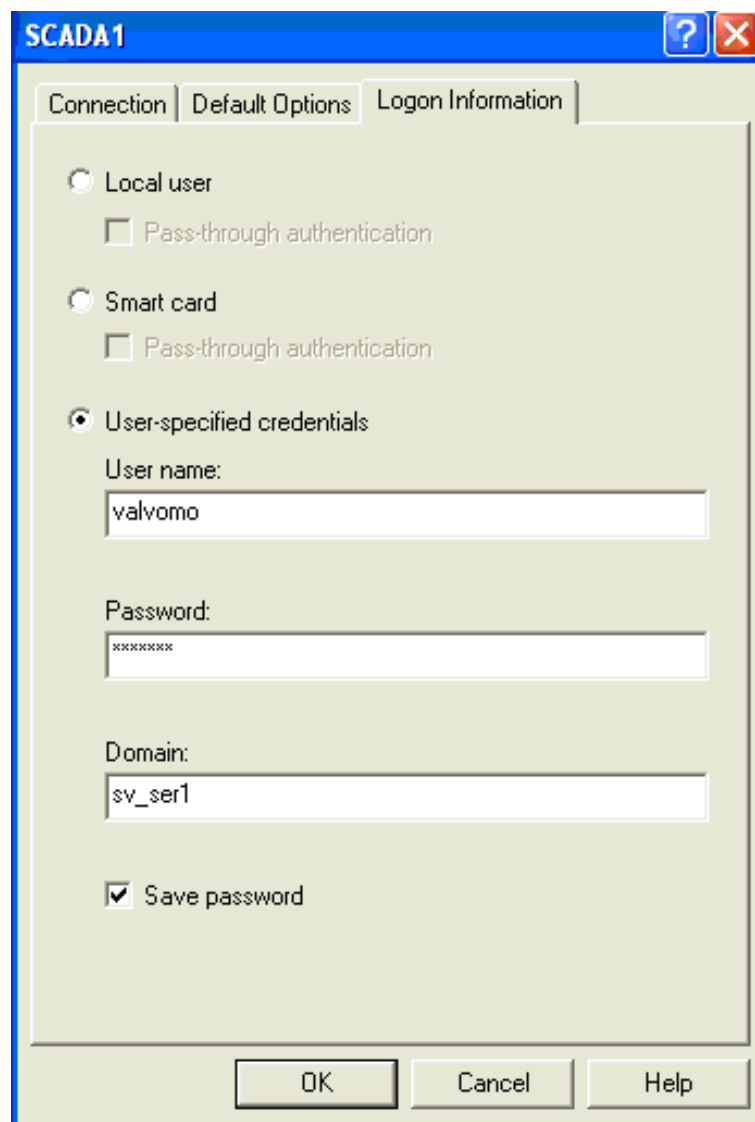
9. Click **Find New Application Set** in the Citrix Program Neighborhood window.



A070545

Fig. 2.5.2.-7 Citrix Program Neighborhood Window

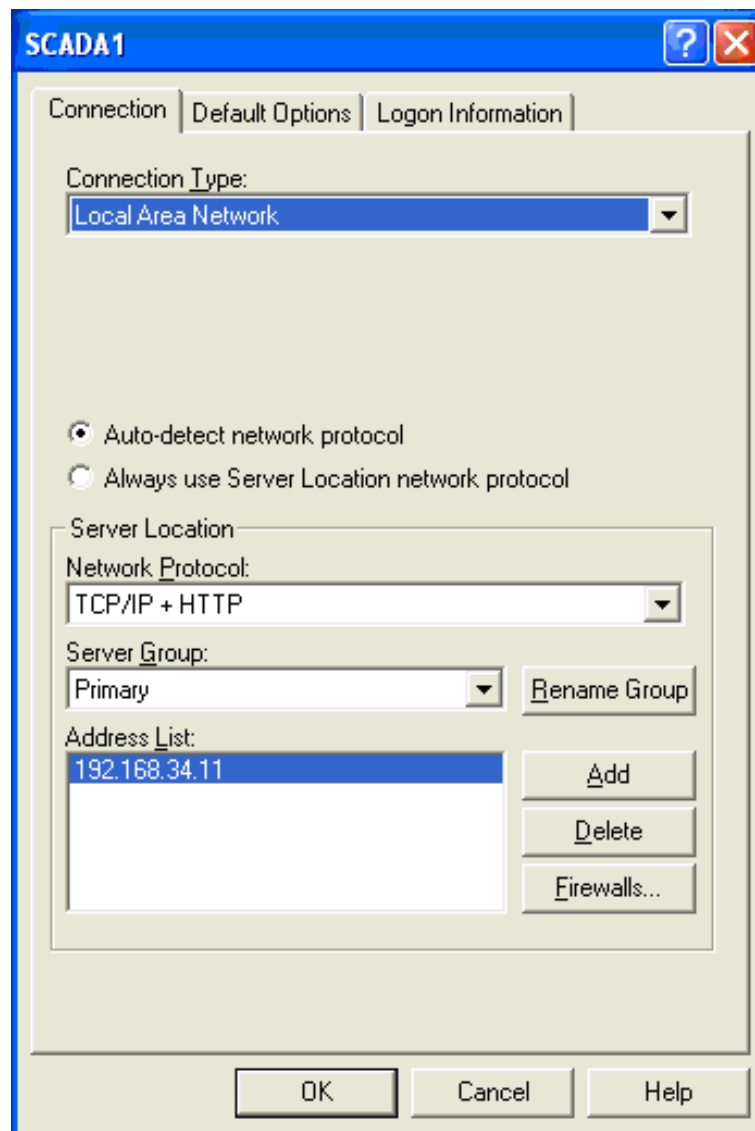
Logon settings of Application Set “SCADA1” User “valvomo” of SV_SER1 is a member of Remote desktop users.



A070552

Fig. 2.5.2.-8 Logon settings

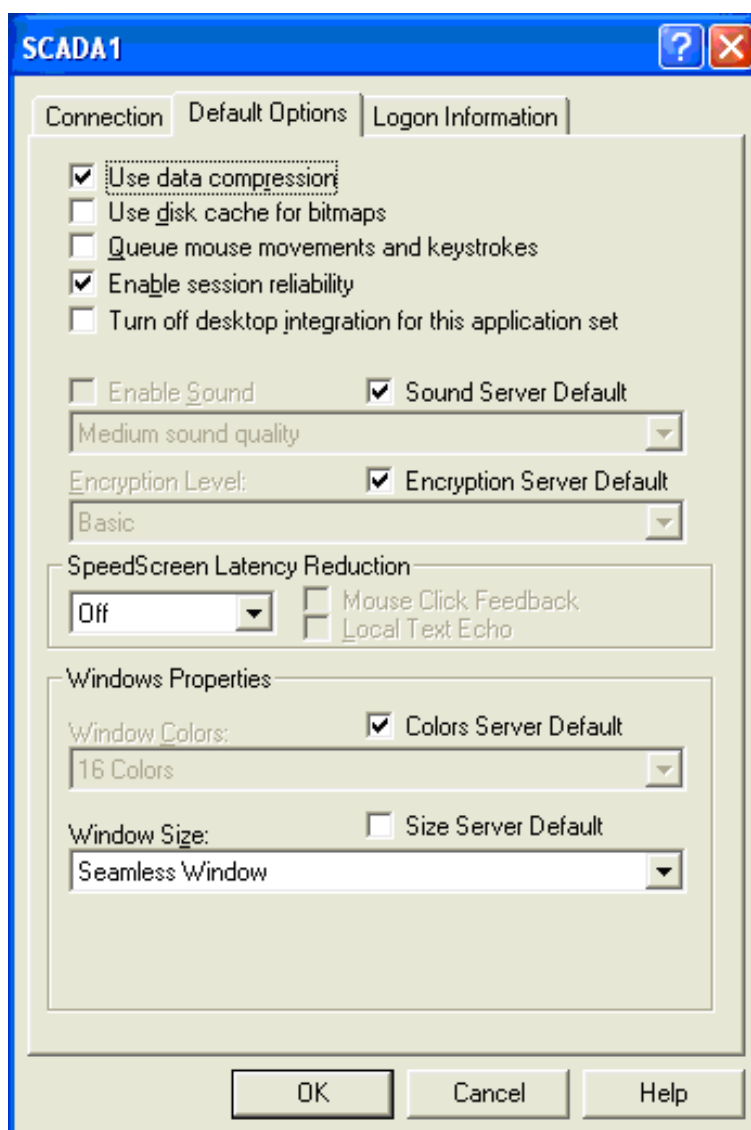
Connection Settings of Application Set "SCADA1"



A070549

Fig. 2.5.2.-9 Connection settings

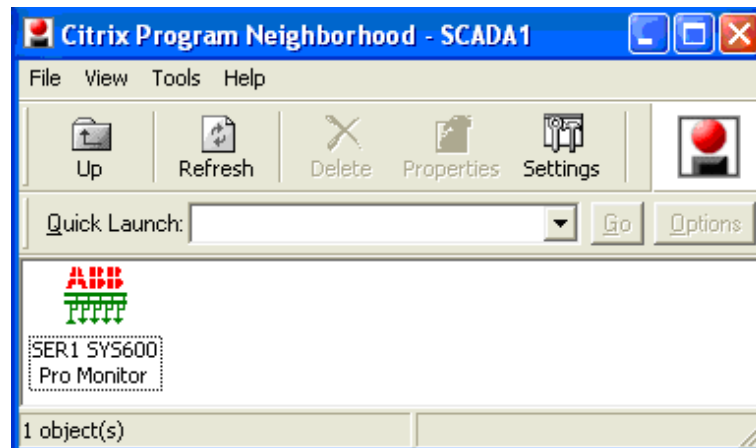
Default Options of Application Set "SCADA1"



A070550

Fig. 2.5.2.-10 Default options

When selecting Application Set "SCADA1" then following folder appears.



A070551

Fig. 2.5.2.-11 FrameWindow MicroSCADA

To open a FrameWindow MicroSCADA picture select “SER1 SYS600 Pro Monitor”

2.6. Installing process communication units

2.6.1. PC-NET process communication unit

The PC-NET process communication unit is a Windows executable which is automatically installed when the SYS 600 packet is installed or upgraded. The instances of these units are defined with the system configuration tool, see System Configuration manual, chapter ‘Configuring process communication’. In runtime, each configured NET in the system configuration will have a corresponding pc_nets.exe process running.

Depending on configuration, the communication lines configured to PC-NET instances will use serial ports, network adapters or PCLTA extension cards (LON communication). The required hardware must be installed and configured before a complete verification of the system configuration can be done.

The installation of the computer hardware used by PC-NET process communication units is described in Section 2.6.1.1. Installing multiport serial card, Section 2.6.1.2. Installing LON cards, Section 2.6.1.3. Installing network cards and Section 2.6.1.4. Verifying PC-NET process communication unit.

2.6.1.1. Installing multiport serial card

Each PC-NET instance supports 12 communication lines and in most cases, additional COM ports are required. The usage of standard COM ports 1-4 is also possible.

The multiport serial card is an extension card which is installed to a PCI slot in the motherboard of the PC. As to the installation procedure, refer to the installation manual of the product. In principle, any PCI based serial card can be used but following product lines and manufacturers are verified and widely used in MicroSCADA Pro systems:

- RocketPort from Control Corp.
- DigiBoard from Digi International
- MOXA serial boards from Moxa Technologies, Inc.

The serial port products which are not PCI-based are also widely available. However, as long as the COM ports provided by these products may disappear from the system during runtime, the overall reliability of the system is worse than in PCI-based alternatives.

In all cases, for the COM port, the communication line used is defined with the SD-attribute of the line object.

2.6.1.2. Installing LON cards

For installation of LON cards, refer to Connecting LONWORKS Devices manual.

2.6.1.3. Installing network cards

If the system configuration contains protocols which use LAN, the necessary network adapters must be installed. In most cases, the process communication uses the same network adapter as the MicroSCADA Pro base system and the installation procedure is the same as described in Section 2.2. Local Area Network (LAN)

The communication lines created to PC-NET instances may use multiple local IP-addresses especially when there is multiple connection to Network Control Centers (slave protocols) or the IEDs which are connected the MicroSCADA Pro are divided to multiple networks (master protocols).

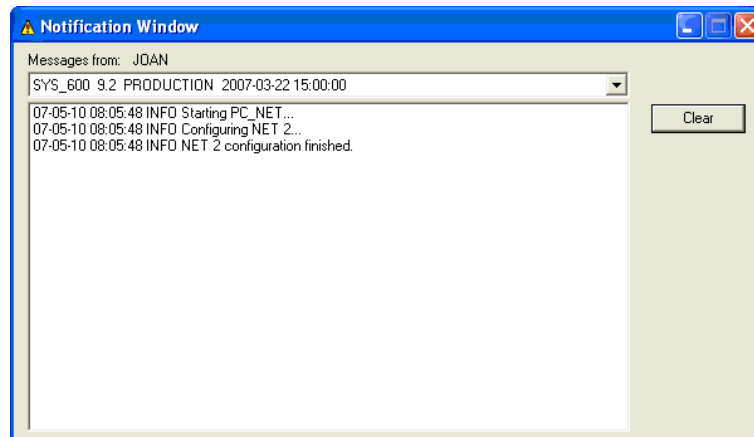
In Windows, it is possible to define multiple IP-addresses to the same network adapter but it is also possible that the used IP-addresses are divided to multiple network adapters. Multiple network adapters are often used in systems requiring redundant communication lines. When the installation and the configuration of the network adapters is complete, the successful 'ping' test described in Section 2.2. Local Area Network (LAN) indicates that the given IP-address is present in the system and it can be used by the PC-NET.

In all LAN protocols supported by PC-NET, line attribute LD defines which local IP-address is used by the communication line.

2.6.1.4.

Verifying PC-NET process communication unit

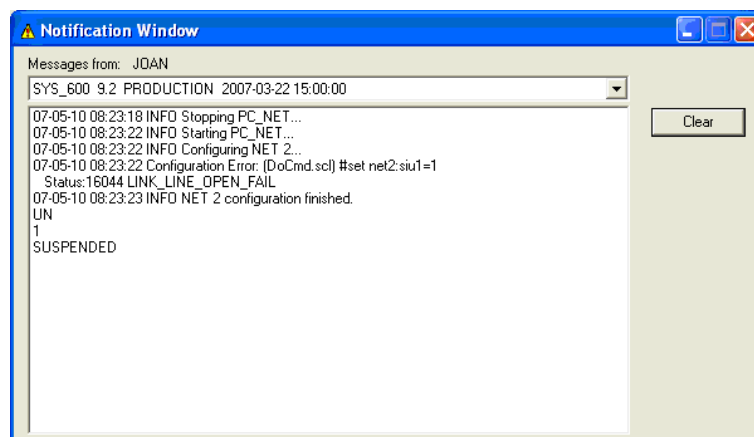
In order to verify the operation of the PC-NET process communication unit, the system configuration must contain at least one configured NET node. When MicroSCADA Pro system is started, following printout shown in Fig. 2.6.1.4.-1 is displayed in the notification window for each configured NET node.



A070502

Fig. 2.6.1.4.-1 Notification window

In case the configuration already contains communication lines and there are errors in the configuration, corresponding printouts will be found from the notification window as shown in Fig. 2.6.1.4.-2 and from file "sys_error.log". In the printout below, the communication line 1 in NET 2 has failed to open the serial port configured for it. When this happens, usually the configured port is already in use or the installation of the serial card is not complete and the given port cannot be found from the system.



A070507

Fig. 2.6.1.4.-2 Notification window showing errors in configuration

As described in the system configuration manual, the startup of the PC-NET process communication unit can be done also using the SCIL procedures. When this method has been used and system is started, the existence of the NET nodes can be verified e.g. using the 'Open Online' function of the system configuration tool. If the

configuration contains errors, the error printout can still be found from the notification window and the used status codes are the same as with the system configuration tool. The status codes are listed in a separate MicroSCADA Pro manual 'Status Codes'.

2.6.2. IEC 61850

The IEC 61850 related process communication unit is an Windows executable, which has been automatically installed during the SYS 600 software installation. Before any actual IEC 61850 process communication occurs from the set of IEC 61850 IED's (i.e. process devices) into SYS 600 process database, there is a need to configure each of the IEC 61850 process communication units to represent the certain part of the underlying process devices. This is made by using the tools included into SYS 600 software, see IEC 61850 System Design manual, chapter Configuration. At run-time, each configured IEC 61850 process communication unit is called an instance. Each of these instances can be seen that the corresponding `opcs_iec61850.exe` process is running.

The actual IEC 61850 protocol communication occurs over the physical TCP/IP network. However depending on the selected configuration, different TCP/IP network related hardware and software has been installed and configured accordingly before the complete verification of the IEC 61850 system configuration can be done, see IEC 61850 System Design manual, chapter Requirements.

2.7. Installing peripheral equipment

2.7.1. Installing printers

Printers are used for automatic event and alarm print, and for operator initiated hard copy. For hard copy, the hard copy functions of eXceed or Windows can be used without any configuration measures in MicroSCADA Pro. On the other hand, the automatic event and alarm print requires that the printers are connected to MicroSCADA Pro. These printers can also be used for MicroSCADA Pro initiated hard copy. The installation descriptions below apply to the printers used by MicroSCADA Pro. Regarding the installation of Windows hard copy devices, refer to the Windows and the printer manuals.

A MicroSCADA Pro printer can be connected in the following ways:

- Directly to a base system computer, through the parallel port or a serial port.
- To a LAN via a printer server.
- Communication unit (NET, serial type connection)

2.7.1.1. Connecting printers to the base system

Printers connected to a NET unit can be made accessible to all base systems in the entirely distributed MicroSCADA Pro system. A printer connected directly to a base system can also be used by other base systems on the LAN. The printer has to be

defined as “shared” in the computer's operating system configuration to which it is directly connected. Printers connected to a LAN can be made accessible to all base systems on the LAN.

On the application level, the printing can be accomplished according to two different principles which determine the appearance of a printout:

- Picture based printing (old, “out of use, no printers available”)
- SCIL defined printing ("transparent" printing)

The SCIL defined printout can contain any characters supported by the printer.

The last mentioned type is specified by the SCIL function `PRINT_TRANSPARENT`.

The picture based printout produced by printers connected to a Windows computer or a LAN is always semi-graphic. Pixel based printout can be obtained only on printers connected to a NET. The fully graphic printout can be obtained on any printers. Each base system and each application is able to recognize and use up to 20 printers. It is possible to configure virtual printers without a real physical correspondence for logging in a file on a disk. When a printer is defined for printer logging, all printout sent to the printer is stored on a disk. This is useful when configuring an event log, that is a disk copy of the event list. A physical printer can also be given more than one printer object definitions to enable several different types of printout to the same printer. The printer operation can be supervised and controlled, for example temporarily stopped and restarted, or the printout can be redirected to another printer. This can be done by means of the ST and CL attributes (refer to the System Objects manual).

2.7.1.2.

Connecting printers to LAN

Printers connected to a base system computer or LAN must be configured in all base systems that uses the printers. Configure the printer in each base system as follows:

1. Create a `PRIn:B` base system object, with at least the following attributes (see System Objects manual):

DT	"NORMAL" (black-and-white ASCII based print out) or "TRANSPARENT" (SCIL defined print out)
DC	"LINE"
SD	Printer device name including UNC path (SD="\My_Computer\My_printer"). The printer must be shared for the UNC name to be a valid value of the attribute
TT	"LOCAL"

In addition, optional features are defined by the following attributes:

LP	Lines per page, this should > = the number set on the printer
QM	Printer queue length
OD	Output destination: "PRINTER", "LOG" (disk files) or "BOTH"
LD, LL, LF	Printer log attributes, specially the management of log files. The attributes are meaningful, if OD = "LOG" or "BOTH"
OJ	Open on Job Basis, set value to 1. The printer is opened before each print job and closed when the job is completed

2. If needed, map the printer for an application with the APLn:BPR attribute. Printers can be mapped for an application, which means that the application recognizes the devices under logical numbers. The printer mapping is required only if you want to use a logical printer number which is not the same as the printer object number.



Only the printers mapped with the logical printer numbers 1 ...15 can be used as alarm and event printers; printer 15 is reserved for event lists.

The following is an example of a configuration where a printer is connected directly to a base system:

```
#CREATE PRI:V = LIST (-
TT = "LOCAL", -
DT = "NORMAL", -
DC = "LINE", -
SD = "\\My_SYS_name\\My_Printer_name", -
LP = 66)
#CREATE PRI2:B = %PRI
```

2.7.1.3.

Connecting printers to PC-NET units

A printer connected to a NET can be used by all base systems connected to the same network. The printer must be defined both in the base systems which uses it and in the NET unit to which it is directly connected. It is assumed here that the NET unit has been defined to the base system as a NODn:B object. Include the following definitions in each base system which will use the printer:

1. Create a PRIn:B base system object with at least the following attributes:

TT	"LOCAL"
ND	The node number of the NET unit to which the printer is directly connected
TN	The device number of the printer in the NET unit to which it is directly connected
DT	"COLOR", "NORMAL", or "TRANSPARENT". Select "NORMAL", if the printer will be used exclusively for the black-and-white character-based printout. Select "COLOR" for all other types of picture-based printout. Even the printer will be black-and-white, "COLOR" is preferable as this mode provides a more picture resembling printout by exchanging graphical characters to printer specific characters. Select "TRANSPARENT", if the printout will be SCIL defined.
DC	"NET"

In addition, optional features are defined by the following attributes:

LP	Lines per page
QM	Queue length maximum
OD	Output destination: "PRINTER", "LOG" (disk files) or "BOTH"
LD, LL, LF	Printer log attributes, specially the management of log files. The attributes are meaningful, if OD = "LOG" or "BOTH"

2. If needed, map the printer for an application with the APLn:BPR attribute, ("Device Mapping"). The printer mapping is required only if you want to use a logical printer number which is not the same as the printer object number.

Include the following definitions in the NET unit to which the printer is directly connected:

1. Select a line for the printer and define the line with the ASCII protocol:

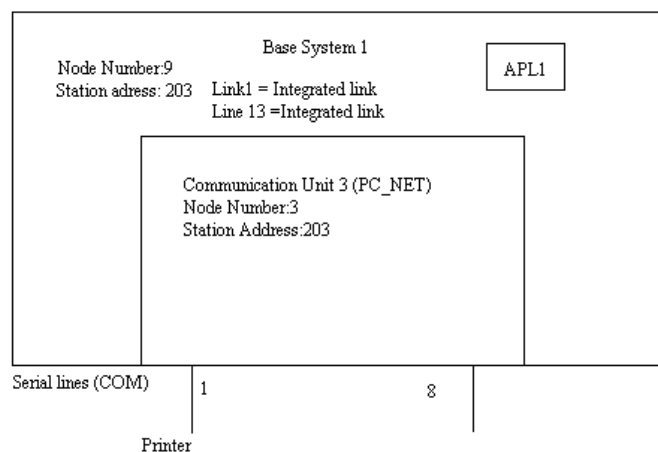
PO	4
IU	1
LT	0
MS, MI	System message handling, see chapter 17
PS	Buffer pull size, see
BR	Baud rate (recommended value 2400)
PY	0
RD	8
SB	1
TD	8
OS	Output synchronization, refer to the system objects manual, chapter 13

2. Define a printer (a PRI object) on the selected printer line with the attributes:

LI	The number of the selected line
IU	1
MI, MS	System message handling, see
AL, AS	0 (the printer reservation is handled automatically by the base system)
PT	Printer type 1 = character-based, black-and-white 2 = "transparent" 3 = pixel-based, black-and-white 4 = character-based, black-and-white, graphical characters replaced by printer characters 6 = Facit 4544 7 = pixel-based, color

For more information on the attributes of the PRI object, refer to the System Objects manual. When a base system is started, its default application (the application created first in SYS_BASCON.COM) sends a message to the printers (form feed). Therefore, make sure that these applications are defined in the NETs.

Using System Configuration Tool for setting printer



A070737

Fig. 2.7.1.3.-1 Base configuration system

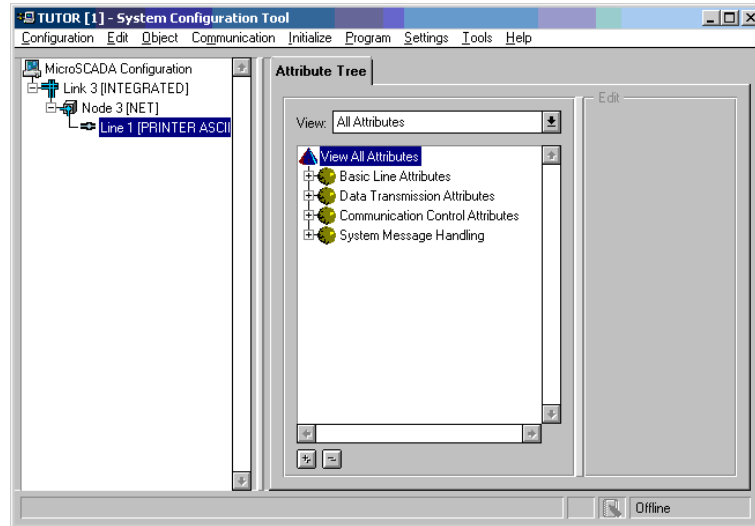
Create an outline of your system configuration or a table that includes the following information:

- The node numbers and station addresses of the base system and NETs.
- Application numbers and possible names.
- NET line numbers.
- Station numbers (in NET and in the base system if different) and station addresses (slave numbers) of all devices.

Use System Configuration Tool and do next steps:

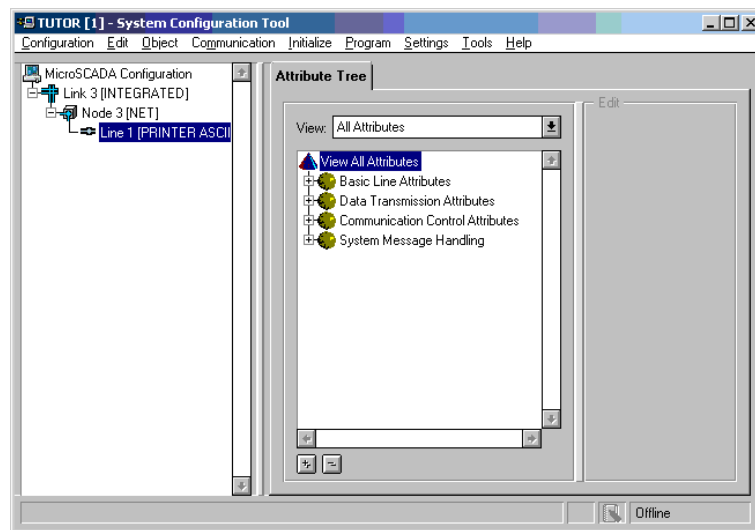
1. Define a configuration, which at least contains the ASCII Printer communication line.
2. Specify the ASCII Printer line specific attributes IU and SD.
3. Save the active configuration.

4. Close the tool, re-open it, and open the active configuration.
5. Under Program/User_Defined you will find preconfigured file for printer.
6. Edit it (remove semicolons) to fit your purpose.
7. Stop the running MicroSCADA and re-start MicroSCADA.



A070738

Fig. 2.7.1.3.-2 System configuration tool



A070739

Fig. 2.7.1.3.-3 SCIL editor

2.7.2.

Installing adapter cards

To install an adapter card, mount the alarm card used into a free PCI expansion slot in the base system computer. A PCI card selects the necessary I/O port addresses automatically.

To use these cards, settings to SYS_BASCON.COM must be done:

Alarm I/O cards

Set parameters SYS:BAA to value representing the card type you use

```
AA = 1; (if no AD is given then old Flytec card)
AW = xx; (seconds between watchdog pulses)
AD = "Nudaq PCI-7256"; supported Nudaq PCI-7256, Nudaq PCI-7250 or Advantech PCI-1760
```

Watchdog output D25 pins 17 and 18 are open when program not running and closed when running.

To check I/O, use test picture and next commands:

```
@A = audio_alarm( "all","on")
@A = audio_alarm("all","off")
@A = audio_alarm(xx,"on/off")  xx=1..7
```

External clocks

To use a Meinberg PCI511 radio clock in the base system, set the SYS:BCL attribute to one of next:

```
"NONE"  = No external clock
"PC31 "  = Radio clock used in PC/ATs. The radio clock is synchronised in accordance with Central European radio time signals.
"PC32"   = PC clock card of type PC32
"PCI510" = PC clock card type PCI510 and new PCI511
# CREATE SYS:V
. . . . .
# SET SYS:BCL = "PC510"
# SET SYS:BCA = 1
. . . . .
# CREATE SYS:B = % SYS
```

2.8.

Installing SYS 600 Application OPC Server

Hardware requirements

The SYS 600 Application OPC Server (AOPCS for short) has no specific hardware requirements. It is compatible with any modern PC hardware. The client application connecting to AOPCS may, of course, have its own hardware requirements.

Software requirements

AOPCS has been tested on the following operating systems:

- Windows 2000 Professional
- Windows 2000 Server
- Windows Server 2003
- Windows Server 2003, Enterprise x64 Edition
- Windows XP Professional

Installation

AOPCS may be installed in any directory. The installation dialog suggests the directory \SC\PROG\AOPCS.

Configuration

Installation and Administration Manual

The instructions to configure the installed AOPCS can be found in the SYS 600 OPC Server manual.

3. System administration

3.1. Transferring objects

The following common functionality is provided by the Export/Import tool:

- Recognizing of all the application objects from the selected MicroSCADA Pro application.
- Defining the common options for the exported and imported application objects.
- Exporting and importing application objects.

The common options for the exported and imported data are provided in the Export and Import field. The application objects to be handled are listed in the Applications Objects list. The progress of operation is indicated by using the progress indicator and the status bar field. The user can operate by clicking the appropriate buttons in the tool. See Fig. 3.1.2.-1

The Export/Import tool can also act as stand-alone tool and be consequently accessed directly through Tool Manager.

Recognizing application objects

During the start-up of the tool, the list of MicroSCADA Pro applications is read. The application, where the Export/Import tool has been started, is used as a default item.

The list of object types contains the following application objects, which are indicated with letters:

P	Process Object Groups
IX	Process Objects
X	Scale Objects
D	Data Objects
C	Command Procedures
T	Time Channels
A	Event Channels
UP	User Defined Process Objects
F	Free Type Objects
H	Event Handling Objects

It is also possible to select **All Object Types** from the **Object Type** drop-down list. When **All Object Types** is selected, the Export/Import tool operates with all the application objects found from the selected application.

Export/Import Tool composition

The Export/Import Tool is composed of:

- a menu bar
- a tabbed page containing search conditions

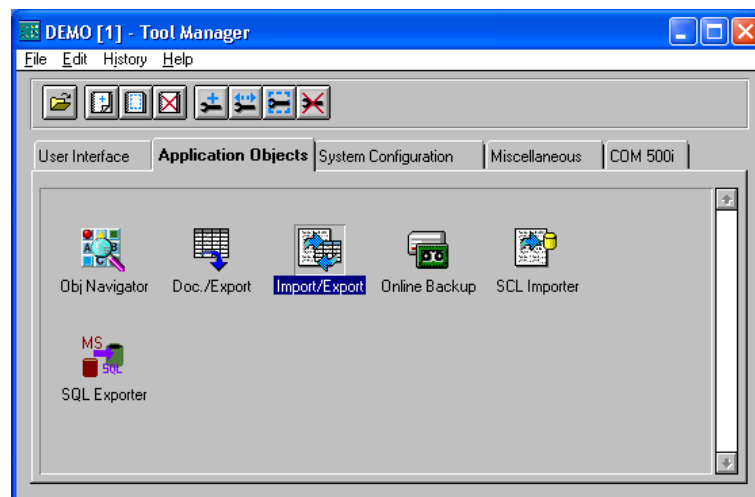
- **Import, Export** and **Close** buttons
- a tabbed page containing application objects to be handled

At the lowest part of Export/Import Tool dialog, there is a status bar showing the number of processed application objects found and selected.

3.1.1.

Opening and exiting Export/Import tool

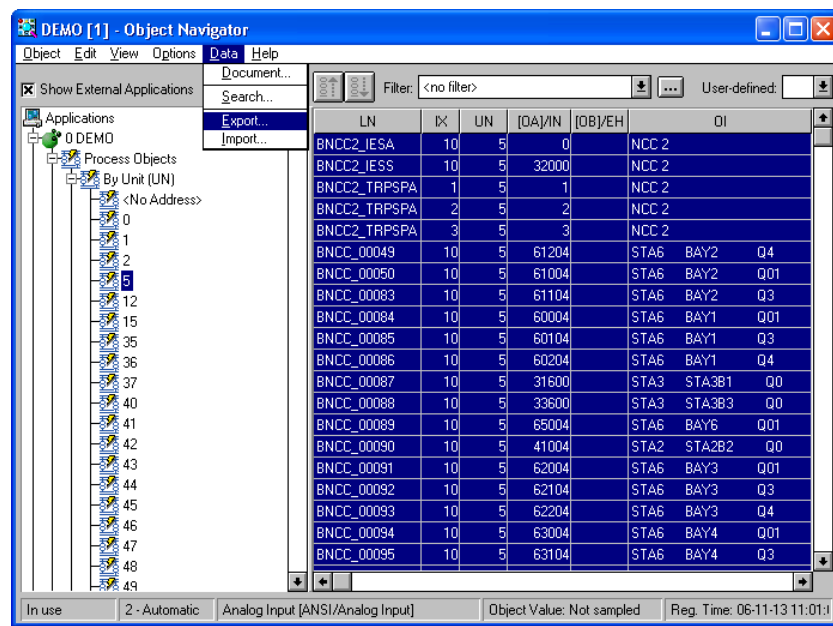
Application Object Import/Export Tool can be run as a standalone tool or as a Application Object Navigator's subtool. The standalone tool can be started by clicking the Import/Export icon and then selecting **File>Open**, see Fig. 3.1.1.-1. If the standalone tool is used, it is possible to export and import the application objects according to the common options for the exported and imported data.



A050154

Fig. 3.1.1.-1 Export/Import icon

Application Object Export/Import Tool can also be started from the Object Navigator menu item by selecting **Data > Export....** See Fig. 3.1.1.-2. In this case, the tool is started on export mode, that is it can only be used for exporting the application objects. Depending on the selected application objects in the Object Navigator, the common options in the Application Object Export/Import Tool become assigned as defaults.



A051193

Fig. 3.1.1.-2 Open the tool from the Object Navigator dialog

When Application Object Export/Import Tool is started from the Object Navigator menu item by selecting **Data > Import**. See 3.1.1.-2. In this case, the tool is started on import mode, i.e. it can only be used for importing the application objects. When the import operation is finished, the selected Object Navigator view becomes updated.

Close the Export & Import Tool by clicking the **Close** button. The tool can also be closed by selecting **Object > Exit** or by the keystroke Alt+F4. See Fig. 3.1.2.-1.

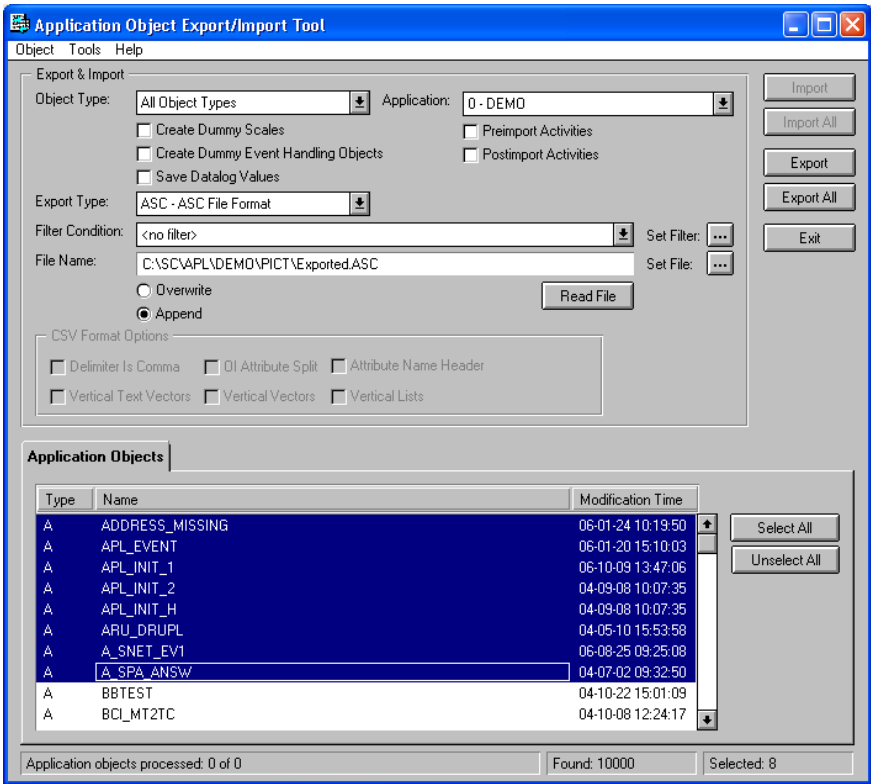
3.1.2.

Exporting objects

Use common options to define the set of application objects to be exported. The application objects that match the common options are listed in the Application Objects tabbed page. Select the application objects that need to be exported. When **Select All** is clicked, all the objects are selected. When **Unselect All** is clicked, none of the objects are selected. To select separate application objects from the list, hold the Ctrl key down while clicking the objects.

When the selection contains at least one application object, **Export** is enabled. When the button is clicked, a destination (export) file is created. See Fig. 3.1.2.-1.

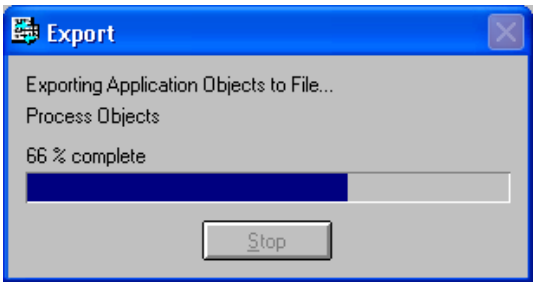
When **Export All** is clicked, all objects are exported without selecting any objects. The Application Objects tabbed page shows only the first 10 000 objects in the list. The button also exports the objects that are not shown in the tabbed page.



A050155

Fig. 3.1.2.-1 Main dialog of Export/Import Tool

During the export operation, the progress indicator displays the operation progress. See Fig. 3.1.2.-2.



A050158

Fig. 3.1.2.-2 Export operation progress dialog

At the end of the export operation, either the objects were successfully exported dialog is displayed or exceptions summary dialog is displayed. See Fig. 3.1.2.-3.



A050157

Fig. 3.1.2.-3 Objects are successfully exported

3.1.2.1.

Exporting formats

The Export/Import tool supports three formats:

- ASCII File Format (ASC)
- SCIL Database Format (SDB)
- Comma Separated Values Format (CSV)

ASCII File Format (ASC)

The ASC Export format is an outdated export format. The ASC format is not editable and data is saved in a slow sequential text file. The file name extension is .asc by default.

SCIL Database Format (SDB)

The SDB export format is based on the SCIL database files or SCIL data files. The SDB format is not editable. The SCIL database files are not limited and the SCIL database's structure is optimized for fast access. Hence it is possible to transfer a program in one step with the SDB export format. The file name extension is .sdb by default.

Comma Separated Values Format (CSV)

The CSV export format is an editable export format and list-based engineering (LBE) uses it. The file name extension is .csv by default.

3.1.2.2.

Defining CSV attributes

To form the CSV data, the following options are available:

- Delimiter is Comma

The data's delimiter is a comma (,) instead of a semicolon (;). Select the Delimiter is Comma check box, if the dot is used as a decimal point instead of comma.

- OI Attribute Split

The OI (Object Identifier) attribute of process objects can have a structure. If the structure exists and the OI Attribute Split check box is selected, the attribute's value is splitted according to the attribute's structure.

- Attribute Name Header

By default the first row of the CSV data represents the two letter attribute names, which you can select. If the Attribute Name Header check box is selected, the first row represents mnemonic instead of attribute names and the two letter attribute names are represented on the second row.

- Vertical Text Vectors

By default the complicated attrubute values are represented as a dumped in a line (compare with SCIL function DUMP). If the Vertical Text Vectors check box is selected, the type text vector's attribute values are represented as vertical.

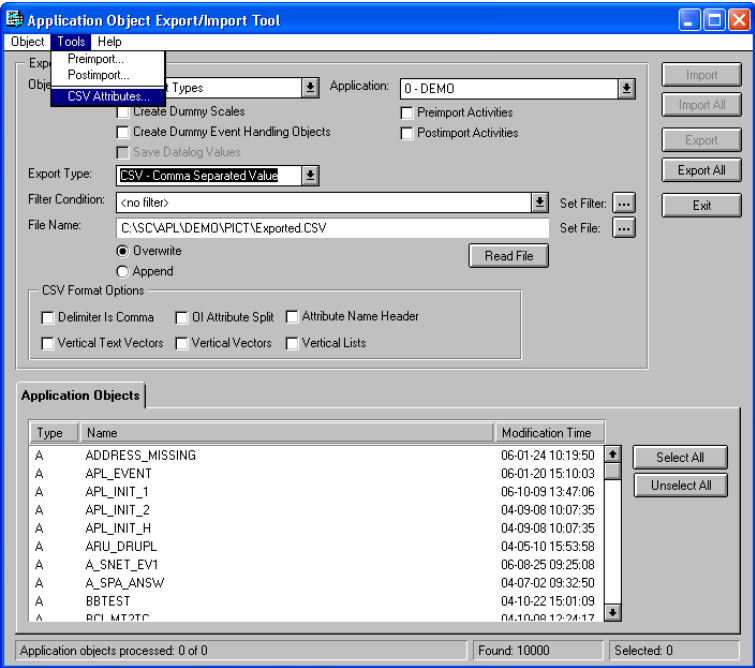
- Vertical Vectors

If Vertical Vectors check box is selected, the type none-text vector's attribute values are represented as vertical.

- Vertical Lists

If Vertical Lists check box is selected, the type list vector's attribute values are represented as vertical.

Define how to form data, their attributes and their order in the CSV data, using the CSV Attribute Tool dialog as shown in Fig. 3.1.2.2.-1. To open the CSV Attribute Tool dialog, select **Tools > CSV Attributes** from the Application Object Export/Import Tool dialog. See Fig. 3.1.2.2.-1.

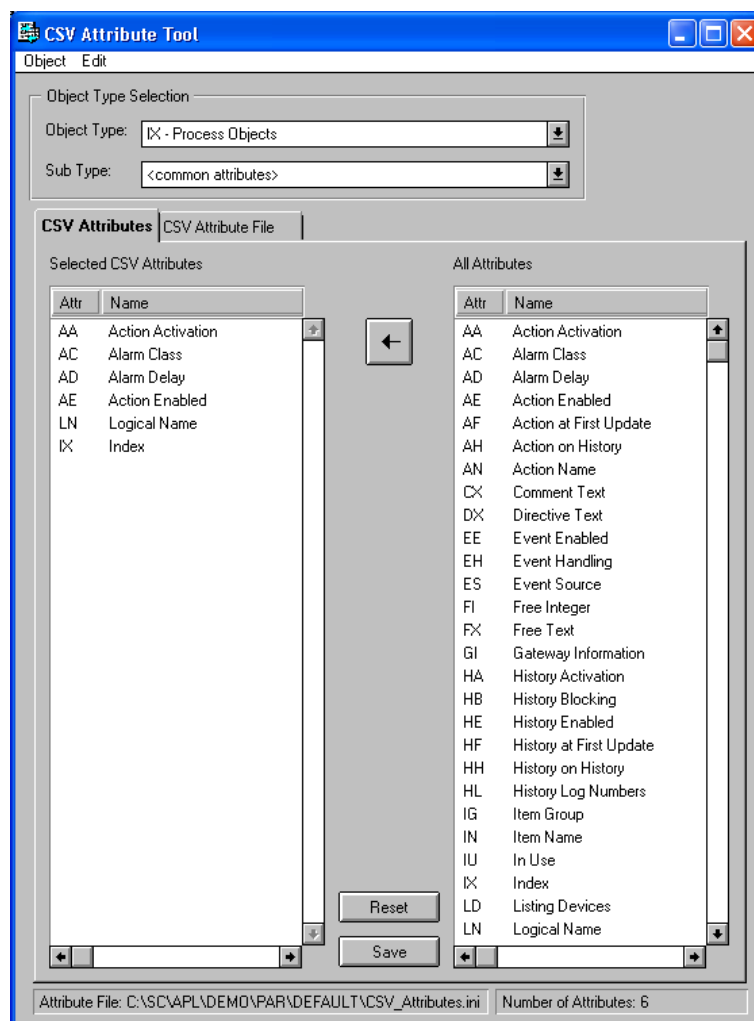


A050160

Fig. 3.1.2.2.-1 Opening CSV Attribute Tool dialog

To define CSV attributes:

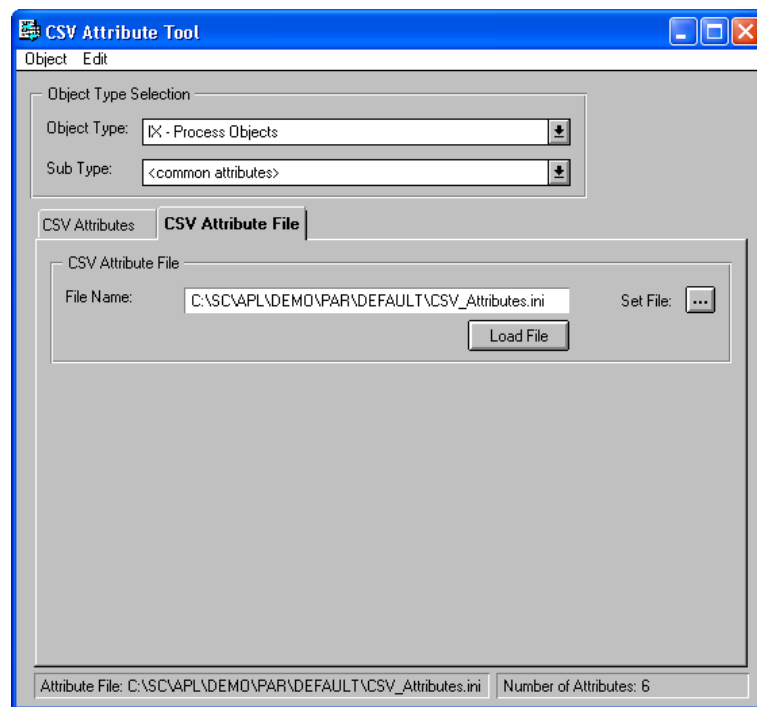
1. In the CSV Attribute Tool dialog, select the object type from the **Object Type** drop-down list. If the pre-defined (IX) or user-defined (UP) process object type is selected, select the sub type from the Sub Type drop-down list.
2. In the **Sub Type** drop-down list, either select the common attributes or the process object type specific attributes. See Fig. 3.1.2.2.-2
3. On clicking the CSV Attributes tab the following two lists are displayed: All Attributes and Selected CSV Attributes. The All Attributes list contains all configurable attribute names, which are available for the current object type. The Selected CSV Attributes list contains attribute names, which are selected from the All Attributes list. By selecting **Edit** menu, it is possible to edit the Selected CSV Attributes list's attributes. See Fig. 3.1.2.2.-2.
4. There are three buttons between Selected CSV Attributes and All Attributes lists: **left arrow**, **Reset** and **Save** button. See Fig. 3.1.2.2.-2.
 - The **left arrow** button is enabled when one attribute is selected from the All Attributes list. Click this button, if you want to copy the selected attributes to the Selected Attributes list.
 - Click the **Reset** button to select and move the configurable attributes to the Selected CSV Attributes list.
 - Click the **Save** button to save all selected attribute names of the object types to a file. When opening the CSV Attribute Tool again, the CSV attributes are read from this file. Attribute names are saved during the last export session by default, to the CSV_ATTRIBUTES.INI file. See Fig. 3.1.2.2.-2.



A050159

Fig. 3.1.2.2.-2 CSV Attribute Tool

- Click the CSV Attribute File tab to change a CSV attribute file. Change the file by clicking Set File (the button with three dots). New attribute names can be loaded from the file by clicking the **Load File** button. See Fig. 3.1.2.2.-3.



A050161

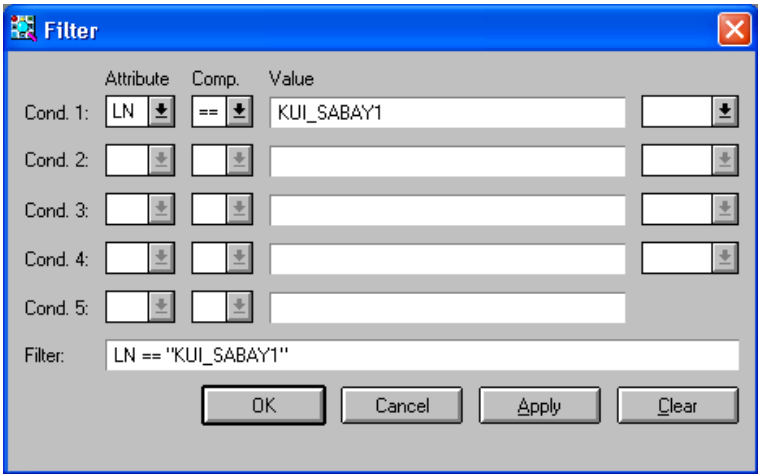
Fig. 3.1.2.2.-3 CSV Attribute File tab

3.1.2.3.

Defining common options for exported data

In addition to the application and object type definitions, it is possible to define other common options for the exported data. Define also the export type, available types are ASC file format, CSV (Comma Separated Values) and SDB (SCIL Database) formats.

Furthermore, it is possible to define SCIL Search Condition for the application objects to be handled through this tool during the export. As a default, the SCIL Search Condition is empty. For example, if the Process Object's type is selected and the SCIL Search Condition `LN=="KUI_SABAY1"` is defined, all the process objects with Logical Name "KUI_SABAY1" become listed in the Application Objects tabbed page. See Fig. 3.1.2.3.-1.

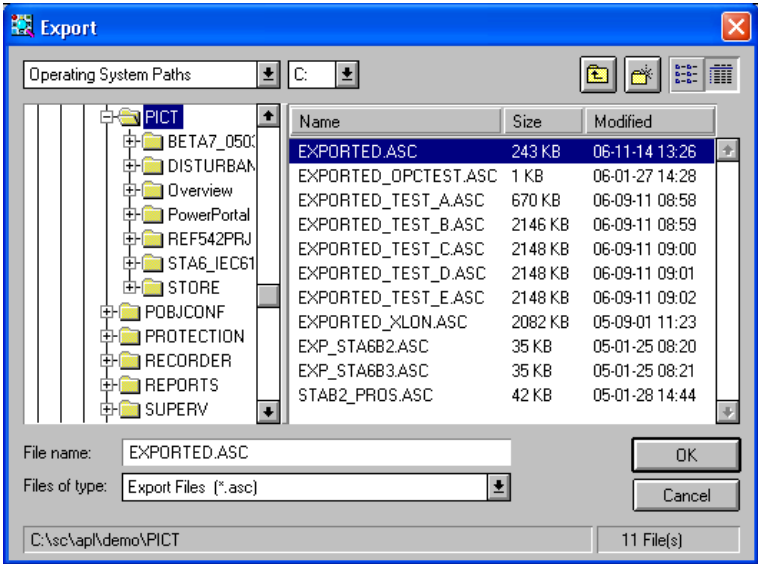


A051194

Fig. 3.1.2.3.-1 Filter dialog

The existing Filter Condition is applied by selecting the condition from the drop-down list or using the SCIL Search Condition dialog (the button with three dots). The tool stores the 30 latest Filter Conditions in the history list. The history list is read in the tool during its start-up.

The file name to be used as a destination (Export) is defined by selecting the file with the File Chooser component (the button with three dots) on the right of the field. The default file name is assigned to the running application's picture folder (logical path PICT is used). See Fig. 3.1.2.3.-2.



A050156

Fig. 3.1.2.3.-2 File chooser dialog

Regarding the file handling options, it is possible to define either Overwrite or Append option. See Fig. 3.1.2.-1. In the Overwrite option, the existing destination file becomes always overwritten. Whereas in the Append option, the new data is appended into the end of the existing destination file. In the Append option, the existing objects are only modified. If you choose SDB (SCIL Database) for export

type, the new data is not appended, if the data already exists. When Read File is clicked, the source file defined by file name is read and the result is shown in the Application Objects tabbed page.

The Save Datalog Values option can be toggled on/off, depending whether the user wants to store the datalog values during the import operation. Default value is off.

3.1.3.

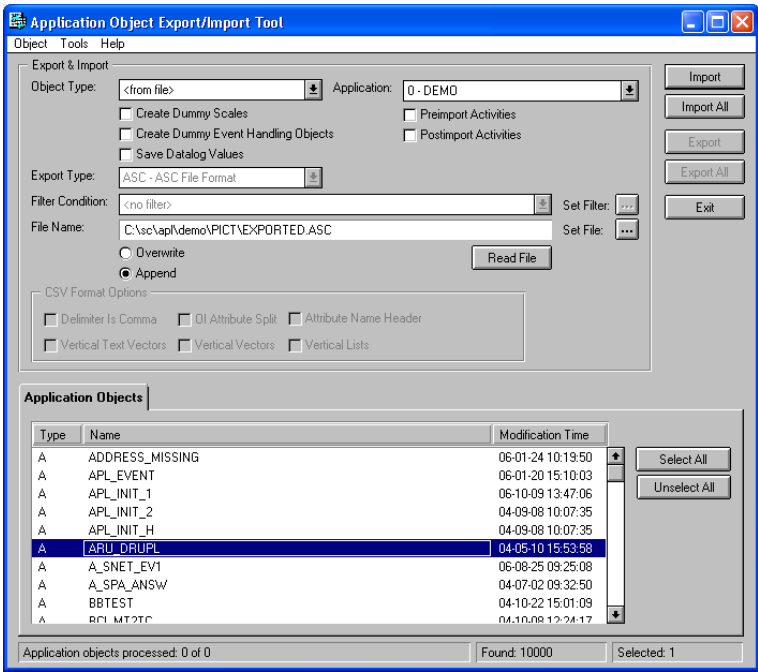
Importing objects

The file name that contains the application objects is displayed in the common options. When the application objects are read from the export file by clicking **Read File** button, the progress indicator displays the read or review operation progress. While previewing objects in the CSV format, the progress indicator cannot show the total number of objects. When all the application objects are read, they are listed into the Application Objects tabbed page. Read objects are saved in a temporary SDB data file, except those objects, which are already in SDB format. Exceptions the preview are shown in the summary dialog. In addition, the Export/Import tool creates the formats during the export. The Export/Import tool also recognizes Load File format (LOF files).

When **Select All** is clicked, all the objects is selected. When **Unselect All** is clicked, none of the objects is selected. To select separate application objects from the list, hold the Ctrl key down while clicking the objects.

When the selection contains at least one application object, the **Import** button is enabled, and when the button is clicked a source (import) file is read. See Fig. 3.1.3.-1.

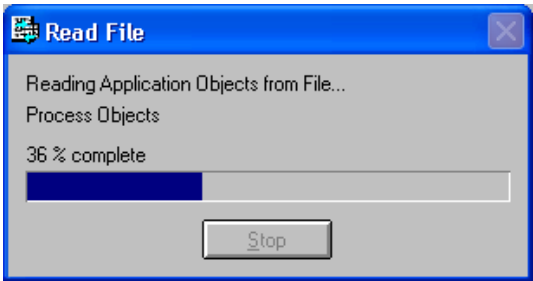
The **Import All** button also imports those objects that are not shown in the tabbed page. The Application Objects tabbed page shows only the first 10 000 objects in the list.



A050163

Fig. 3.1.3.-1 Main dialog of Export/Import Tool

During the import operation, the progress indicator displays the operation progress. See Fig. 3.1.3.-2. If the file cannot be read, an appropriate notification dialog is displayed for the user.

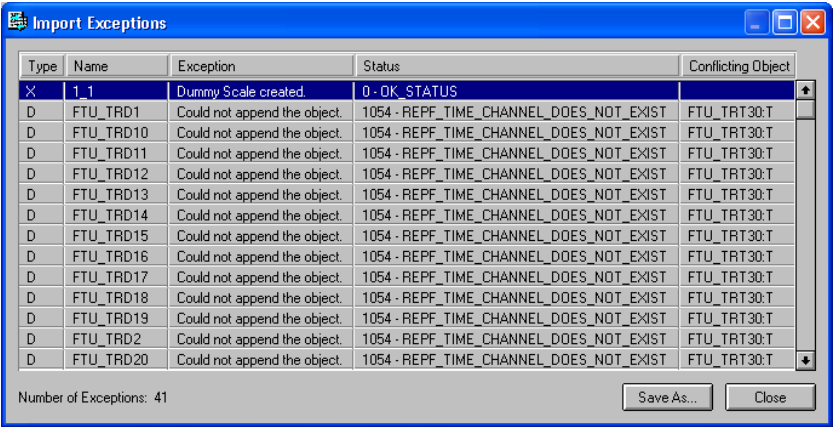


A051195

Fig. 3.1.3.-2 Import operation progress dialog

An exception can occur, when the tool imports application objects. Due to an exception, the application object cannot be created or modified according to the import file. If one or multiple exceptions occur, they are listed in the Import Exceptions dialog. See Fig. 3.1.3.-3. This dialog displays the following information:

Type	Letter that identifies the object type
Name	Name of an object
Exception	Context of exception (create new or modify an existing object)
Status	SCIL status received from the system
Conflicting Object	The name of the object that causes the conflict



A051196

Fig. 3.1.3.-3 Import Exceptions dialog

Functions of the dialog:

Button	Functions
Save As...	Opens the file chooser to specify the location for .log file to save the occurred exceptions. As a default, the file chooser is opened in the application's PICT folder, and the default file name is Default.log.
Close	Closes the dialog

3.1.3.1.

Defining common options for imported data

In addition to the application and object type definitions, it is possible to define other common options for the imported data.

The file name to be used as a destination source (Import) is defined by typing the file name into appropriate field or selecting the file by using the File Chooser component (the button with three dots) on the right of the field. The default file name is assigned to the running application's picture folder (logical path PICT is used). See Fig. 3.1.2.3.-2.

Regarding the object handling options, it is possible to define either Overwrite or Append option. In the Overwrite option, data of the existing destination object are always overwritten. Whereas in the Append option, data of the object are appended to a database, if the object does not exist.

The Create Dummy Scales and Create Dummy Event Handling Objects options can be toggled on/off depending on whether the user wants to create scales and event handling objects that do not exist, while process objects are imported. Objects will

be created with their original names, but they are dummy. So, they should be modified afterwards to make process objects work properly. The Import Exceptions dialog informs about created objects.

The Save Datalog Values option can be toggled on/off, depending whether the user wants to store the datalog values during the import operation. Default value is off.

The Preimport Activities and Postimport Activities options can be toggled on/off depending on whether the user wants to execute activities just before and after the proper import. Pre- and postimport definition tools are started from menu Tools —> Preimport ... and Tools —> Postimport A pre/postimport command procedure/SCIL file is executed by DO function. In postimport an argument in DO function call is a list which includes all imported predefined process objects. The list is in form list(LN, IX), where the vector attribute LN includes logical names and IX indexes. The second argument passed in function call is the number of the application, where objects are imported into. Import tool assumes that procedures/SCIL files return the status of operation. If preimport fails, a notice dialog with status will be raised to ask whether to do the actual import or not. If preimport (or postimport) totally fails (syntax error, etc.), the standard error dialog will be raised and import will be interrupted.

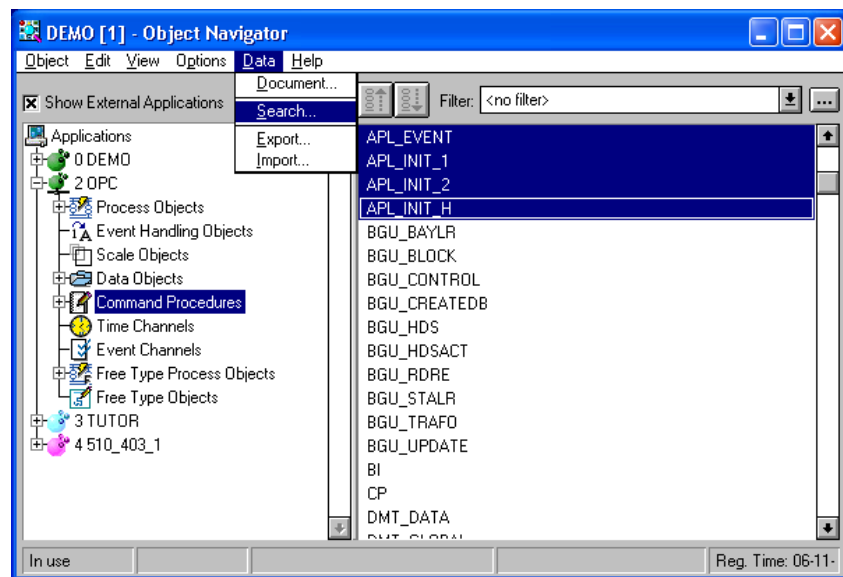
3.2. Searching strings

The Search Tool is used for searching strings in objects and files. The tool can search strings through command procedure and data objects, text files, pictures and Visual SCIL Object files (VSO files). The Search Tool can be opened through the Object Navigator. The input for the tool is selected object types in the Object Navigator. If objects or files are also selected, they act as targets for the search. The search type, target names and other search conditions are saved in the SEARCH.INI parameter file, when the tool is closed. The Search Tool can also act as a stand-alone tool and be opened through the Tool Manager.

3.2.1. Opening and exiting Search tool

Select **Data > Search** in Object Navigator to open the Search Tool. Before opening the Search Tool, the object types can be selected in the Object Navigator. These objects act as an input for the Search Tool. If no object type is selected, Text file search is default. If objects or files are also selected, they act as targets for the search. In Fig. 3.2.1.-1 the first four command procedures of the external application are selected for search in the Object Navigator.

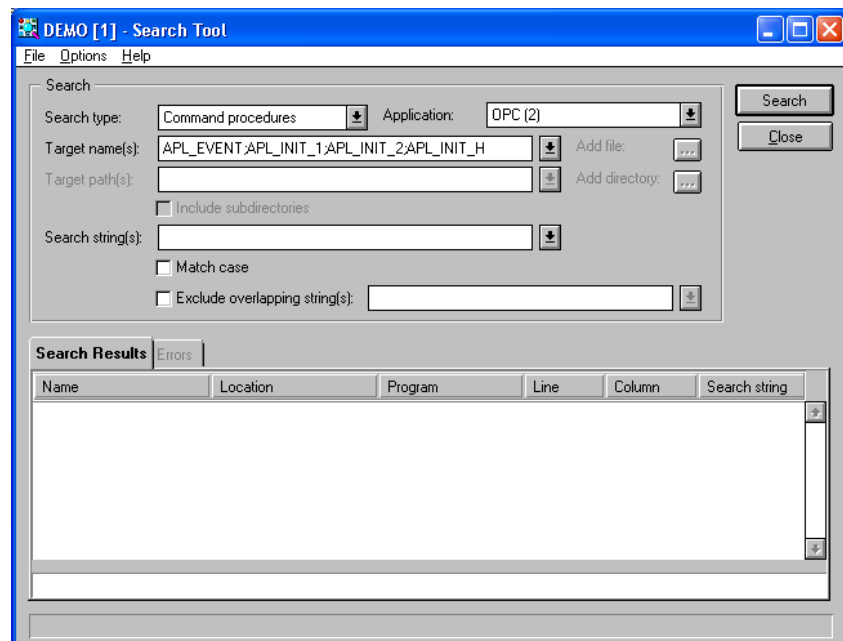
The Search Tool can also be opened as a stand-alone tool from the Tool Manager's Miscellaneous tab.



A051529

Fig. 3.2.1.-1 Opening the Search Tool from Object Navigator.

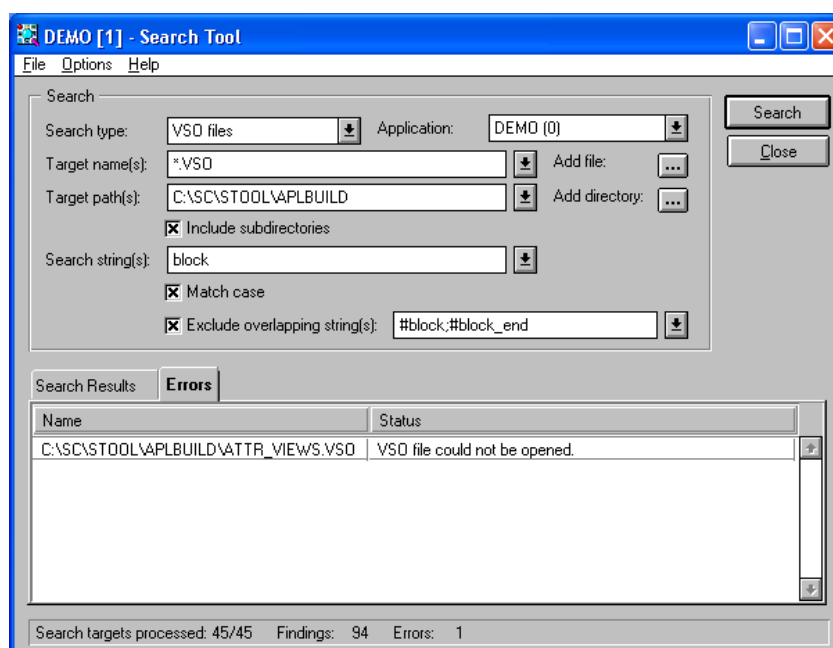
Fig. 3.2.1.-2 shows Search Tool, when the tool is started through the Object Navigator. Note that in case the Search string(s) field is empty it should be filled out before the search can be completed.



A051530

Fig. 3.2.1.-2 View of the Search Tool started from Object Navigator.

Close the Search Tool by clicking **Close**. The tool can also be closed by selecting **File > Exit** or by pressing ALT+F4.



A051532

Fig. 3.2.2.-2 A completed 'VSO files' search with a failure

3.2.3.

Defining searches

The search conditions are the input for a search. They consist of a search type, an application, target names and paths, search strings, overlapping strings to be excluded and two boolean options: Include subdirectories and match case.

Search conditions are saved in the SEARCH.INI parameter file when the Search Tool is closed.

If the search criteria (a search type, target names, target paths) include incompatible files, a warning dialog informs that the incompatible files were skipped from the search. Dialog occurs if, for example, the following criteria are selected:

Search type	Text files
Target name	*
Target path	Folder containing pictures and/or VSO files.

The files are skipped, because they are not text files.

Search types

Select the appropriate search type from the **Search type** drop-down list.

Supported search types for report database search:

- Command procedures
- Data objects

Supported search types for file searches:

- Pictures
- VSO files
- Text files

When the Search Tool is opened, it displays the default search type, which depends on how the tool is started.

If Search Tool is started through Object Navigator, the default search type is selected on Object Navigator. For example, if the VSO files object is selected on Object Navigator and Search Tool is opened. The default search type is VSO files in the **Search type** drop-down list. If no object type is selected or Search Tool does not support the selected type, default search type is Text files.

If the tool is started as stand-alone, default search type is the last saved search type in the SEARCH.INI parameter file while the Search Tool was closed. If the tool is started for the first time, default search type is Command procedures.

When the appropriate type is selected, the Target names drop-down list is also changed to correspond the search type, see Fig. 3.2.2.-2.

Application

Select the application, where the search is performed, from the application drop-down list. The application list is updated when the search type is changed. The option is disabled when searching text files.

Applications are in the form <name>(n), where <name> is the application's name and (n) is the application's logical number. Local applications are available for both the file and database searches. External applications are available only for database searches.

If Search Tool is started through Object Navigator, the default application is the application that was selected before the Search Tool was opened. If the tool is started as stand-alone, default application is the last saved search type in the SEARCH.INI parameter file while the Search Tool was closed.

Target names

The **Target names** drop-down list can be edited. The Target names box can be edited as follows:

- Type a name or names separated with a delimiter. Wildcard characters are allowed in the names.
- Select an earlier saved item from the drop-down list.

- Select a file by browsing the directory. Add a file by clicking the **Add file** button. In the Select File dialog, select the appropriate file. The file name is the last in the Target names box and it is separated by the delimiter from the other file names. A directory name is added to the target paths box.
- Select objects or files in Object Navigator. The selected items are target names when Search Tool is started. If the selected objects or files are more than 255 characters long, the extra characters are removed. The search is single search, because of this the Target name box is disabled. To enable the Target names drop-down list, make another selection in Object Navigator or click the **Add file** button.

The default target names for the different search types:

Command procedures	*
Picture	*.PIC
VSO files	*.VSO
Text files	*
Data objects	*

Target paths

The Target paths option can be used only for file searches. When performing the report database searches, the option is disabled. The Target paths box can be edited as follows:

- Type a directory name or names separated with a delimiter.
- Select an earlier saved item from the drop-down list.
- Select a directory by browsing the directory. Add a directory by clicking the **Add file** button. In the Select Directory dialog, select the appropriate directory. The directory is the last in the Target paths box and it is separated by the delimiter from the other file names.

If the selected application is the current one (the application number is zero), the field also accepts logical paths as input. For other local applications, logical paths are not available. Therefore, when an application is selected in the Search Tool, the field is changed to 'PICT' and dimmed. The 'PICT' stands for '`\sc\apl\<apl_name>\pict`'. It is not a logical path anymore.

Include subdirectories

If the Include subdirectories check box is selected, the tool also searches all subdirectories. The option is used only for the file searches and it is disabled for the other searches.

Search strings

The **Search strings** drop-down list can be edited. Its text box shows a string or strings to be searched. Different strings are separated by the delimiter to enable multiple searches. Earlier searched strings can be selected to the text box from the saved choices in the drop-down list.

Match case

If the Match case is selected, letters are case sensitive.

Exclude overlapping strings

Strings can be typed to the text box, when the Exclude overlapping strings check box selected.

When the check box is selected, a defined string is excluded from a search, if they overlap the strings selected in the Search strings box. When the check box is not selected, the text box is disabled.

Changing delimiter

The default delimiter is semicolon (;) and it separates the editable search conditions items. To open the Delimiter dialog, select **Options > Set Delimiter**.

When a delimiter is changed, all the choices containing old delimiter in the drop-down lists are updated with the new one.

3.2.4.

Saving searches

Search results can be saved and printed. To save the search results, select **File > Save Results** and to print the search results, select **File > Print Results**.

Both produce the following output:

```
Search type: 'Pictures'
Target name(s): '* .PIC'
Target path(s): 'C:\SC\LIB4'
Search string(s): 'store'
Exclude overlapping string(s): '!restore'
Application: 0
```

Name	Location	Program	Line	Column	Search string
C:\SC\LIB4\base\ALARM\USE					
BAU_ALARM1.	PF:ALARM_BASE	EXIT	1	4	store
PIC					

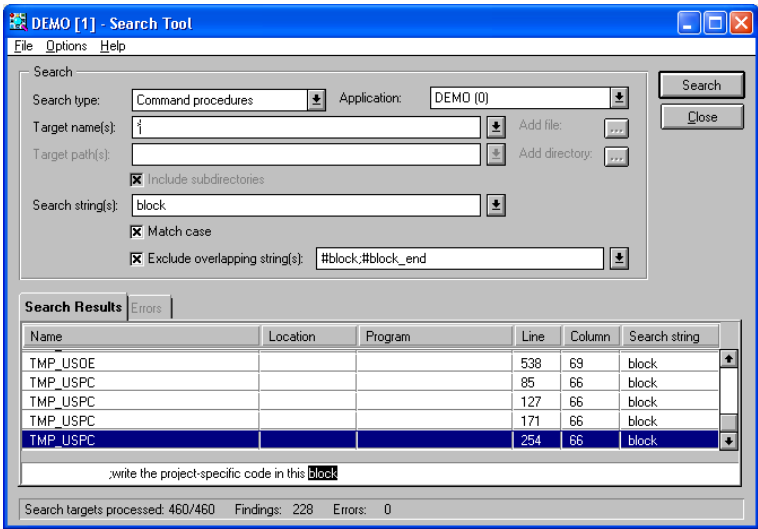
BAU_ALARM2.PIC	PF:TEMP2_BASE	EXIT	1	4	store
C:\SC\LIB4\base\BBONE\inst					
BGI_BASE.PIC	MAIN PICTURE	EXIT	1	4	store
BGI_BASE2.PIC	MAIN PICTURE	EXIT	1	4	store
C:\SC\LIB4\base\BBONE\use					
BGU_DBTLA.PIC	PF:DBT_BASE	EXIT	1	4	store
C:\SC\LIB4\FMOD\MVPROCESS\Use					
FPU_BAY2A.PIC	MAIN PICTURE	.	3	2	store
		START_PRO-			
		GRAM2			
FPU_C501V.PIC	MAIN PICTURE	.KEY_OK	22	11	store
...					

Standard printer set-up dialog is displayed by selecting **File > Printer Setup** from the menu, if the tool is started from the local VS monitor.

3.2.5. Analyzing search results

The Search Results page shows results of a search completed according to conditions. The page has a header, a result list and a text box for a program line. When a search proceeds, hits are shown and added to the result list as they are found. When a search is completed or stopped, the last hit is selected and the program line including a searched string is shown and highlighted in the text box, if no errors are encountered. See Fig. 3.2.5.-1

Up to 10000 results can be handled on Search Results page. If the limit is exceeded, the search is interrupted and an information dialog pops up.



A070492

Fig. 3.2.5.-1 Search completed with no errors

The figure above shows a command procedure search completed with no errors. The last finding is selected and the program line with a searched string is shown as highlighted in the text box.

If the Search Tool is started via the Object Navigator, double-clicking the selected hit result starts the corresponding editor or dialog and brings up the program, where the searched string was found (for 'VSO files' search only VS Dialog editor is started). If the tool is started as stand-alone, straight away editing is possible only for Text files searches.

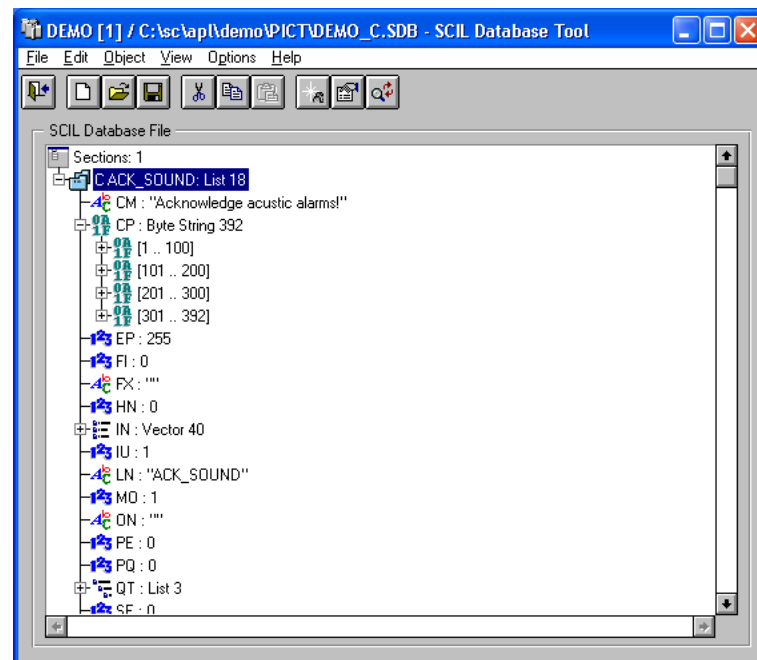
3.3.

SCIL Database Tool

In MicroSCADA, it is possible to create SCIL database files that may contain any SCIL data types. For more information on SCIL databases, see the Programming Language SCIL Manual. In the operating system's file system, the SCIL database files are recognized by their file extension .SDB (SCIL Database file).

SCIL Database Tool provides the following functions for these files:

- Creating a new file
- Opening an existing file to display the contents of the file in a structured way
- Editing the file with regard to the sections, element names and their values
- Saving the file
- Copy and paste the contents of the file between two SCIL Database tools open at the same time



A051199

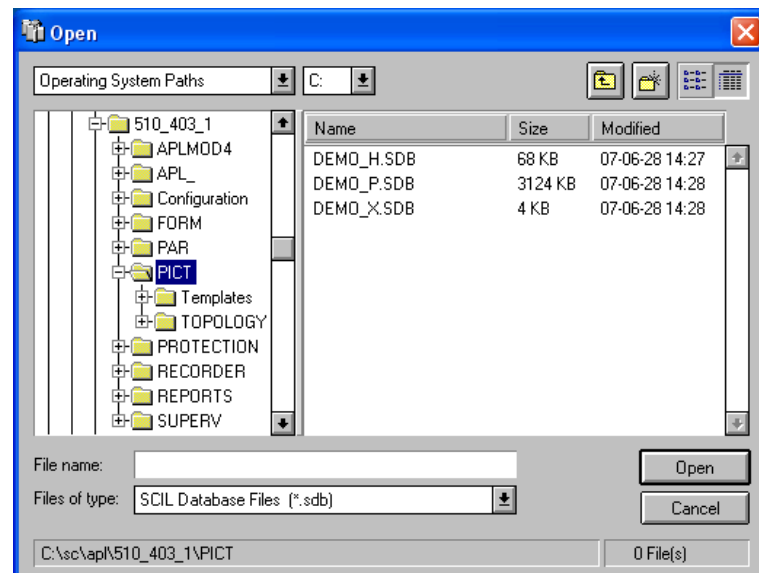
Fig. 3.3.-1 Main view of the SCIL Database Tool

The main view of the tool consists of the following parts. See Fig. 3.3.-1

- Menubar
- Toolbar
- Area for displaying the file contents in a structured way

3.3.1. Opening the SCIL Database File

When **File > Open** is selected or the appropriate toolbar button is clicked, the File Chooser dialog is opened. See Fig. 3.3.1.-1.



A051205

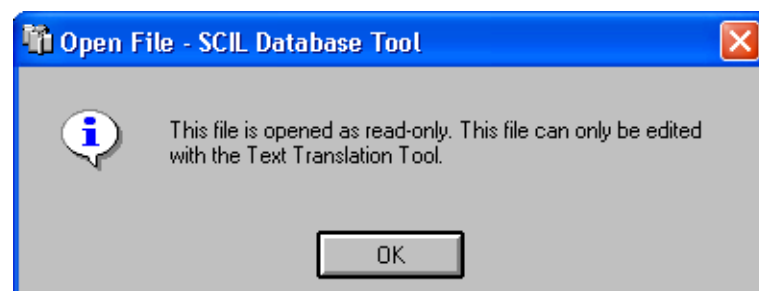
Fig. 3.3.1.-1 Selecting a file in File Chooser

The default folder for File Chooser is the active application's PICT folder. The files, which have the .SDB extension are shown as default. When the SCIL Database file to be opened is located in another folder, use the File Chooser to select the appropriate drive and folder. To open the file, select the file name from the list or type the name of the file to the File name field. It is also possible to open the latest files from the tool's file history list, located in the File menu of the tool.

When the file is opened, its contents is displayed in the tool in a structured way.



If the Text Database files (SYS_TEXT.SDB, APL_TEXT.SDB or other Text Database files defined by the APL:BTB Text Databases attribute) are opened in SCIL Database Tool, the following dialog is displayed for the user. See Fig. 3.3.1.-2.



A051206

Fig. 3.3.1.-2 Notification for opened Text Database files

In this case, the tool disables the saving function. This is because, the Text Translation Tool should be used for localization purposes of these files. However, it is possible to edit the contents of this file, and save it to another file name.

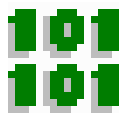
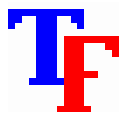
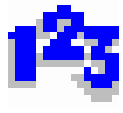
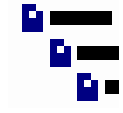
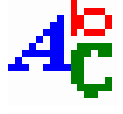
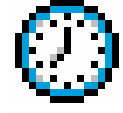
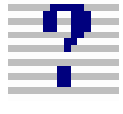
When the file is opened in the tool, its contents is shown in the tree. Sections node of the tree displays the number of sections included in this file. As a default, the Sections node is expanded, thus displaying all the sections found from the file. The contents of each section becomes displayed, when the appropriate Section node in the tree is expanded.

For each section and element, the following information is displayed:

- Name of the section or element
- Data type of the section or element
- Value of the section or element

Section is identified in the tree with following icon.

The data types for element values are identified with icons  according to the following Fig. 3.3.1.-3

Data Icon	Data Type
	Bit String
	Boolean
	Byte String
	Integer
	List
	Real
	Text
	Time
	Vector
	None

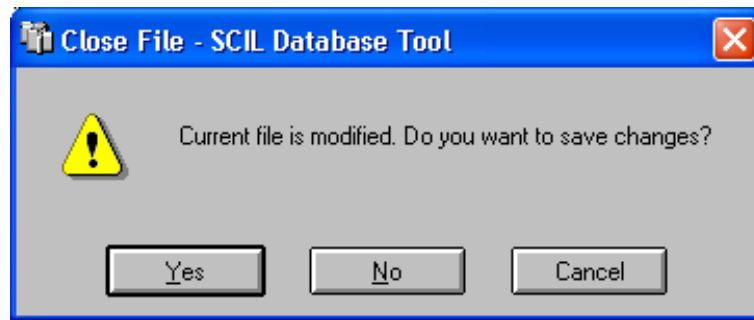
A051207

Fig. 3.3.1.-3 Data type icons

3.3.2.

Creating a New SCIL Database File

When **File > New** is selected or the appropriate toolbar button is clicked , the contents of the SCIL Database file tree is cleared in the tool. If the current SCIL database file in the tool has been modified before creating a new file, the following dialog is displayed to the user. See Fig. 3.3.2.-1.



A051200

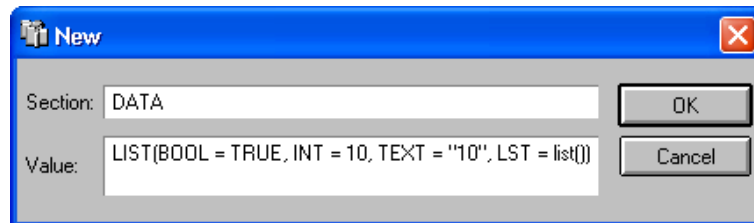
Fig. 3.3.2.-1 Current file is modified notification

When **Yes** is clicked, the tool saves the current SCIL database file before clearing the contents of tree. If **No** is clicked, the contents of tree is cleared without saving the content of the current SCIL database file. If **Cancel** is clicked, the contents of tree is not cleared.

3.3.3.

Creating New Section with Value

When root node Sections is selected in the tree, select **Object > New** from the menubar or click the appropriate toolbar button . Then the New dialog is opened. See Fig. 3.3.3.-1



A051201

Fig. 3.3.3.-1 Opening the New dialog

Type the section name in the Section text field, and the value in the Value text field. Here are some examples for entered values:

TRUE

10

"10"

LIST(FIRST=1, SECOND=VECTOR(1,2,3), THIRD=TIME)

VECTOR(TRUE, FALSE, 12)

Clicking **OK** or pressing ENTER creates a new section in the tool with the entered value and closes the New dialog. Clicking **Cancel** discards the entered section with value and closes the dialog.

3.3.4. Editing Section Value

When some section is selected in the tree, select **Object > Edit** from the menubar or click the appropriate toolbar button . Then the Edit dialog is opened. See Fig. 3.3.4.-1

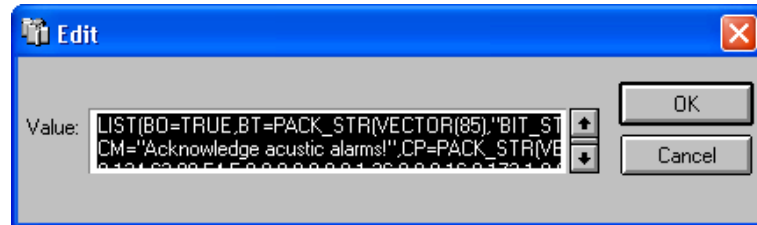


Fig. 3.3.4.-1 Edit dialog

Modify the contents of the existing value in the text field. When **OK** is clicked or ENTER is pressed, the modified value is applied into tool and Edit dialog is closed. If the entered value does not follow the SCIL syntax (for more information on this, see the Programming Language SCIL manual), the message dialog (Fig. 3.3.4.-2 is displayed for the user. Clicking Cancel discards the entered value and closes the dialog.

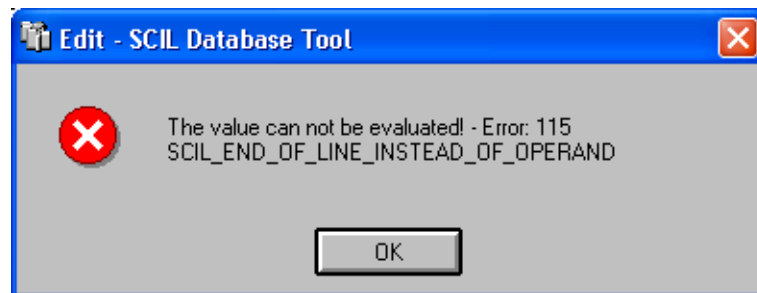
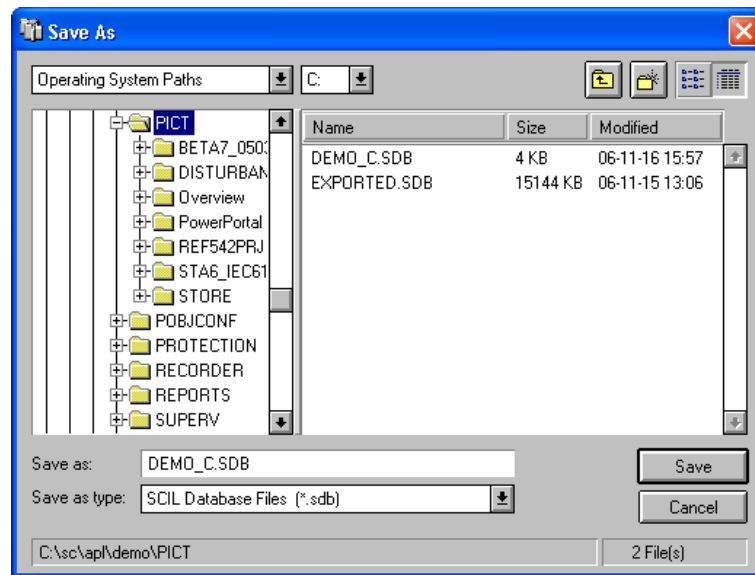


Fig. 3.3.4.-2 Incorrect value entered in the Edit dialog

3.3.5. Saving SCIL Database File

When **File > Save As** is selected from the menubar, the Save As dialog is opened. See Fig. 3.3.5.-1. The files with .SDB extension are recognized as SCIL Database files and are listed in the default folder. Type the file name in the text field, and click **Save**. Or select some existing file name in the list to replace the existing file. Clicking **Cancel** discards the operation and closes the dialog.



A051208

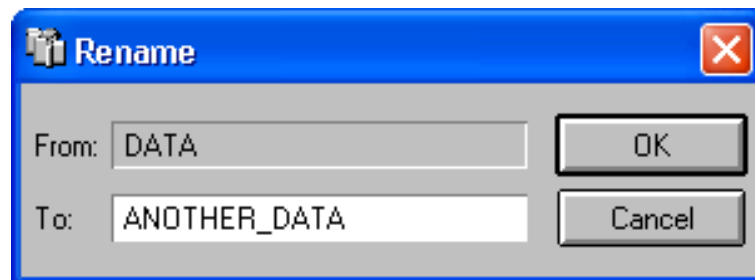
Fig. 3.3.5.-1 Save as dialog

If an existing file has been modified in the tool, select **File > Save** from the menubar or click the appropriate toolbar button  to save the file with the same name.

3.3.6.

Renaming Sections

Select some existing section in the tree, and select **Object > Rename** from the menu or click the appropriate toolbar button . Then the Rename dialog is opened. See Fig. 3.3.6.-1



A051204

Fig. 3.3.6.-1 Rename dialog

Type another section name in the text field. Clicking **OK** or pressing ENTER accepts the entered section name in the tool and closes the Rename dialog. Clicking **Cancel** discards the entered new section name and closes the dialog.

3.3.7.

Deleting Selected Content

Select some existing section or value in the tree, and select **Edit > Cut** or click the appropriate toolbar button. The selected content is deleted. However, it is possible to paste this section or value later, because it is saved to the clipboard of tool.

3.3.8. Transferring information between two SCIL Database Tools

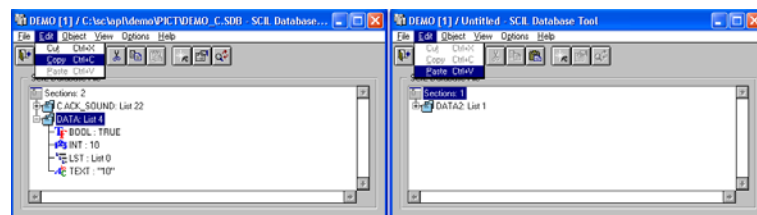
It is possible to copy and paste section and value information between two parallel SCIL Database Tools. The purpose of this function is to provide easier engineering, when there is a need to reuse the data from one SCIL Database File to another. This can be done by the following way:

1. Start the first SCIL Database Tool from the Tool Manager.
2. Start the second SCIL Database Tool from Tool Manager
3. Open the SCIL Database in this tool. Select some section name in the tree.
4. Select **Edit > Copy** from the menubar or click the appropriate toolbar button.

The contents of the selected section is copied to the clipboard of the first tool. After this is done, do as follows:

5. Select the root node of the tree, that is, click the **Sections** item.
6. Select **Edit > Paste** from the menubar or click the appropriate toolbar button.

The contents of the copied section is pasted in the contents of the second tool. See Fig. 3.3.8.-1



A051209

Fig. 3.3.8.-1 Transferring information between two tools

3.4. Hard disk management

The Disk Management Tool (DMT) is designed for automatic and manual hard disk management in MicroSCADA Pro, that is file deleting, moving and compression, in order to free up disk space. The Disk Management Tool requires MicroSCADA version 8.4.3 or higher. The DMT uses external executable AR.EXE for compression.

The Disk Management Tool is able to perform the following actions to maintain the disk space available:

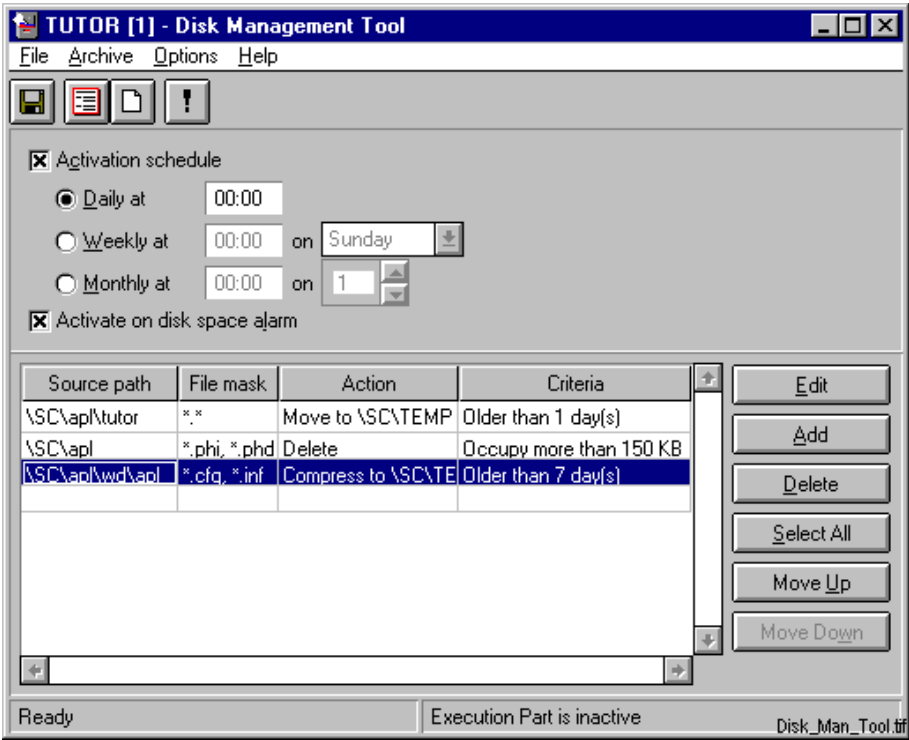
- Deleting files
- Moving files to another hard disk or removable media
- Compressing files and deleting original ones, archives created by the DMT are handled by the DMT User Interface part

The DMT can be activated in one or more of the following ways:

- Manual triggering via the User Interface
- Automatic periodic triggering at predefined time of the day
- Automatic triggering based on the LIB 5xx hard disk space alarm

3.4.1. Using Disk Management tool

The Disk Management Tool is accessed by double-clicking the Disk Management icon in the Miscellaneous tab of the Tool Manager. When the DMT User Interface part is started, the main dialog box appears. The typical appearance of the main dialog box is shown in 3.4.1.-1.



A051549

Fig. 3.4.1.-1 The Disk Management Tool main dialog box

Menus

Table 3.4.1.-1 File menu commands

Save	This command saves current activation settings and file sets to the parameter file. Base system objects are updated according to the new activation settings. The left toolbar button also corresponds to this command.
View Log	View logThis command opens the viewer dialog box to view the log created by the Execution part. Log messages are displayed as plain text, each one on a single line. Messages include date and time stamp, message type (information, caution and critical), and the message text. 'Information' messages are those not requiring immediate attention, such as the number of processed files from each file set, the time when the Execution part was started and so on. 'caution' messages are logged when there is an I/O or other non-critical error, but the DMT is able to recover and continue execution. 'critical' messages are logged when there is a critical error, which has caused the Execution part to stop. Note that the log viewer is able to display up to 10000 messages of the log, so it is necessary to clear the log periodically. The log file is stored in the language-independent format. When it is viewed in the UI part, messages are translated using the current language. The second toolbar button corresponds to this command.
Clear log	This command empties the log file and immediately logs a message that the log file was cleared. The third toolbar button also corresponds to this command.
Run now	This command activates the Execution part immediately, if it is not already running. If there are unsaved changes in file sets or activation settings, the tool prompts whether to save them prior to activating the Execution part. The fourth toolbar button also corresponds to this command.
View messages	This command shows the dialog box containing recent messages received from the Execution part. The dialog box also opens automatically when a new 'critical' or 'caution' message is received. See for more detailed description of the message dialog.
Exit	This command closes the UI dialog box. If there are unsaved changes in file sets or activation settings, the tool prompts whether to save them.

Table 3.4.1.-2 Archive menu command

Open	This command allows the user to view and extract files from archives created by the Execution part. See for the description of the archive-handling dialog.
------	---

Table 3.4.1.-3 Options menu command

Toolbar Visible	This option toggles the toolbar state.
-----------------	--

Table 3.4.1.-4 Help menu command

About	This command opens the About information sheet.
-------	---

Toolbar

	Corresponds to the Save command in the File menu.
	Corresponds to the View log command in the File menu.
	Corresponds to the Clear log command in the File menu.
	Corresponds to the Run now command in the File menu.

3.4.1.1.**Activating automatic disk space settings**

The following activation methods are supported by the Disk Management Tool (DMT):

- The time-based activation (daily, weekly or monthly)
- The activation based on LIB 500 disk space alarm

These options are independent of each other, but only one instance of the Execution part may run at a time. Therefore, if the Execution part was triggered by the disk space alarm or manually, and has not finished before the time-based activation has occurred, then the time-based activation is ignored.

1. Setting a daily, weekly or monthly activation in the main dialog
2. Select the Activation schedule check box in order to activate the option buttons.
See
3. Select on of the following options, Daily at, Weekly at or Monthly at, depending on which kind of activation is preferred.

Type the time of the day for the activation in the freely editable text box next to the option button. The time must be typed in 24 hour format, for example 16:30. For the Daily at activation, in addition to the time of the day, also the day of the week has to be selected from the drop-down list next to the time text box. For the Monthly at activation, in addition to the time of the day, also the date has to be selected from the spin box next to the time text box.

The monthly activation will be ignored on months, which do not contain the selected day. For example, the Execution part will not be activated on February, if the 30th day is selected.

Setting activation on disk space alarm is done by selecting the Activate on disk space alarm check box. The disk space alarm limit can be adjusted with the LI attribute of the process object 10 in the B_HDS process object group, see the Application Objects manual for more detailed information on adjusting the attribute.

Changing B_HDS process object group also effects LIB 5xx since it uses the same group. If LIB 5xx is installed after adjusting the LI attribute, the LIB 5xx default value will replace the adjusted value.

3.4.1.2. Creating new file sets

Each file set consists of the following attributes:

Table 3.4.1.2.-1 File attributes

Source path	This is the directory specification, where source files are located. It can be application-related or operating system-dependent absolute path.
File mask	This attribute is the pattern of the file names to operate on. It is also possible to specify several patterns separated by semicolon. The DMT correctly handles file names matching more than one pattern. For example, if A*. * and *.PHD are specified, APL_991004.PHD will be processed only once.
Action	One of the following actions can be performed by DMT on file sets: Delete: Deletes all files matching the pattern and criteria. Move: Moves all files matching the pattern and criteria to another location. Compress: Places all files matching the pattern and criteria into the archive and deletes original ones if the operation was successful. The archive file name can be a maximum of eight characters long, excluding the extension. The extension can be freely chosen and a maximum of three characters long. Character selection for both the archive name and the extension follow the standard DOS file naming convention. Note that for the compression operation to succeed, the amount of free disk space on the drive where MicroSCADA is installed needs to be more than twice the size of the files to be compressed.
Action Destination	This attribute is only applied for Move and Compress actions. For Move action, it specifies the directory, where to move the affected files. For the Compress action, it specifies the destination archive file. The archive name can be a maximum of eight characters long, excluding the three character extension, because the destination file name is given as an argument to AR.EXE.
Criteria	One of the following criteria can be checked by the DMT to find out whether to process the file set: Time: All files older than the specified time stamp and matching the pattern are processed. Size: If the size of any file matching the pattern is greater than the specified limit, the file is processed.
Criteria value	This is the number of criteria units, selected for the file set. This value must be between 1 and 999.
Criteria unit	The following units are applied to the 'Time' criteria: 'day' 'month' 'year' The following units are applied to the 'Size' criteria: KB Kilobyte, is equivalent to 1 000 bytes. MB Megabyte, is equivalent to 1 000 000 bytes GB Gigabyte, is equivalent to 1 000 000 000 bytes

File sets are processed by the Execution part in the same order as they are listed in the UI main window. Two buttons, Move up and Move down, allow changing the order.

3.4.1.3.

Deleting file sets

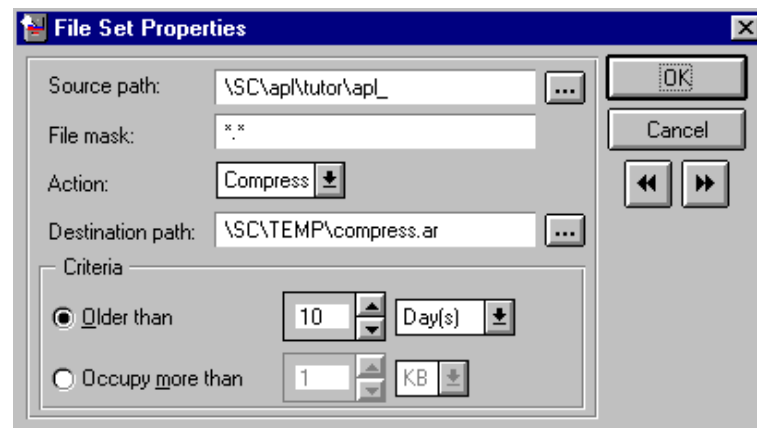
File Sets can be deleted as follows:

1. Select the file set(s) to be deleted. Several file sets can be selected by holding down Ctrl and clicking on the sets to be selected. Clicking **Select All** selects all the file sets in the main dialog box.
2. Click **Delete**. The tool prompts to confirm the operation.

3.4.1.4.

Defining file set properties

The File Set Properties dialog allows to create file sets and edit attributes of existing file sets. The appearance of the dialog is shown in Fig. 3.4.1.4.-1.



A051594

Fig. 3.4.1.4.-1 The File Set Properties dialog

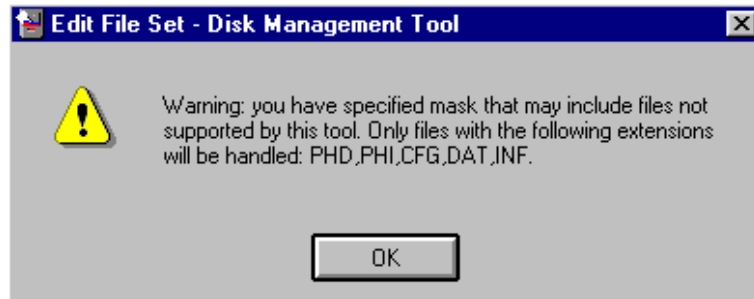
The File Set Properties dialog contains dialog items for all attributes described in the File sets section. The browse button enables a file chooser allowing selecting the directory or file specification.

Adding new file sets

New file sets can be added as follows:

1. Click the **Add command** button in the DMT main dialog.
2. Select a Source path by typing the path in the freely editable text box, or click the Browse button next to the text box and select the path with the file chooser.
3. Insert File mask by typing the pattern in the freely editable text box. Acceptable extensions for the files are phi, phd, cfg, dat and inf, files with other extensions are not handled. It is also possible to specify several patterns separated by semicolon. If, for example, d*.*;u*.ini is used as the file mask pattern, a warning

shown in Figure 11.2.2.-2 is displayed. The warning appears after the first file set that may include not supported files, has been approved, but only once every time the DMT is used.



A051595

Fig. 3.4.1.4.-2 *Warning about a file mask that may include files not supported by the DMT.*

4. Select the appropriate Action for processing the files included in the file mask. The drop-down list provides the Delete, Compress and Move options.
5. The destination path has to be defined for the Move and Compress actions. Type the path in the freely editable text box or click on the browse button to select the path by file chooser. For Compress action a file name for the archive file needs to be defined in addition to the destination path, for example `\sc\temp\compress.ar`.
6. In the Criteria group box, click Older than to select time criteria or Occupy more than to select space criteria.
7. Select the criteria value from it's respective spin box and unit from it's respective drop-down list.
8. Click OK to accept the settings.

The OK button propagates the new file set to the main dialog and then closes the File Set Properties dialog.

The Cancel button abandons any changes and closes the dialog. If there are unsaved modifications, the tool prompts whether to save them.

Editing existing file sets

Existing file sets can be edited as follows:

1. In the DMT main dialog click on the file set to be edited.
2. Click the Edit button.
3. Do the necessary changes in the File Set Properties dialog.
4. Click OK.
5. The OK button propagates changes to the main dialog and then closes the File Set Properties dialog.

The Cancel button abandons any changes and closes the dialog. If there are unsaved modifications, the tool prompts whether to save them.

The two navigation buttons in the File Set Properties dialog can be used to move between file sets in the main dialog. The left arrow moves to the previous file set in the list and the right arrow moves to the next one. If there are unsaved changes in the File Set Properties dialog, the tool asks whether to save them prior to moving. Saved changes are propagated to the main dialog; the separate Save command should be given to save file sets to the parameter file.

3.4.1.5.

Viewing execution messages

When the Execution part is activated, and the UI part is open, the Execution part sends urgent messages to the UI part. All messages sent to UI are also logged, but not all of the logged messages are sent to UI. When a 'critical' or a 'caution' message arrives, see **File > View Log** in Section 3.4.1. Using Disk Management tool, the UI part opens the Execution Message dialog. The appearance of the dialog is shown in Fig. 3.4.1.5.-1.



A051569

Fig. 3.4.1.5.-1 The Execution Part dialog

The dialog shows the message status icon, the time stamp, the message text, and the SCIL status code if any. These messages are not stored permanently. When the main dialog is closed, they are automatically removed.

The **Close** button closes the dialog.

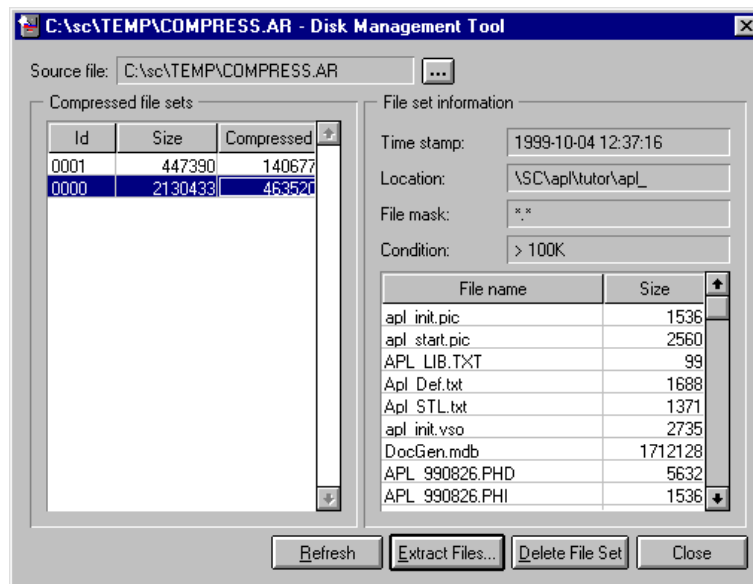
The **Clear** button removes all the messages from the list, but they still remain in the log file.

The "Open this dialog upon incoming critical and caution messages" check box allows turning off the dialog pop-up. If this option is turned on, then incoming 'information' messages are placed on the list, but the dialog is not automatically opened. However, the last message sent by the Execution part opens the dialog regardless of the message status.

3.4.1.6.

Viewing log

The Archive dialog handles archives created and updated by the Execution part. It allows deleting compressed file sets and extracting individual files from archives. The appearance of the Archive dialog is shown in Fig. 3.4.1.6.-1.



A051597

Fig. 3.4.1.6.-1 The Execution Part dialog

The Source file text box shows the name and the path of the currently open archive. The corresponding Browse button allows selecting another archive.

The leftmost list contains IDs of compressed file sets in the first column. IDs are 4-digit numbers assigned in the ascending order. The result of the first compression receives the ID 0000, the next one has the ID 0001, and so on. Other two list columns contain the original and the compressed size of the whole data.

The rightmost group box displays the following information related to the selected file set:

- Time stamp, the date/time when the compression was performed
- Location, the original location of files
- File mask, the file mask of the file set
- Condition, the condition used to select files
- The list, that shows the name and the original size for each file

The Refresh command button forces the tool to refresh the contents of the archive. It is useful to reflect changes made by the recent activation of the Execution part.

The Extract files... command button allows to extract all or only selected files from one file set at a time. When this button is clicked, a dialog is displayed allowing changing the destination directory.

The Delete file set button allows deleting one or more selected file sets. There is no way to delete individual files from a compressed file set.

3.5. Starting SYS 600

3.5.1. Starting base systems

To start a base system:

1. Switch on the computer and the display.
2. After the power has been switched on, the memory is tested and the operating system is started.
3. MicroSCADA can be started either manually or automatically, depending on the configurations made to the system.
4. You can log on to Windows, either automatically or manually, depending on the configurations you have made to the system. Manual logging is needed only if monitors are opened manually in the same computer where base system is running.

3.5.2. Base System startup procedures

Base system runs as a service in the operating system. This means that the program runs in the background without any visible user interface.

At startup, the MicroSCADA main program runs the following operations:

- The base system is configured with the SYS_BASCON.COM file.
- The remote communication system is configured and possible NET units are started (SYS_NETCON.COM).

3.5.3. Application startup procedures

The applications that are configured in the SYS_BASCON.COM are started after the service has started. For each application that has started and has been set to "HOT", the following tasks are performed:

- The entire process database of the application is copied from disk to the primary memory. The values for process objects with SS= =2 are marked as not logged (status code 10).
- An event channel (APL_INIT_1) is activated. Often the channel starts an application-specific command procedure(s). The function is defined in the event channel configurations.
- All time channels in the active applications, which are connected to data objects and should have started during the system break, are executed. The missing report data, due to the break, is marked as not logged. Command procedures and data objects with SE= =1 are executed. After the marking of data objects is complete, another event channel (APL_INIT_2) starts another command procedure(s).

The tasks are performed regardless of whether they are started from the SYS_BASCON.COM file or later on. If the application is a part of a hot stand-by system, the procedures are identical.

The command procedure started by APL_INIT_1 is normally programmed to perform, for example, the following operations:

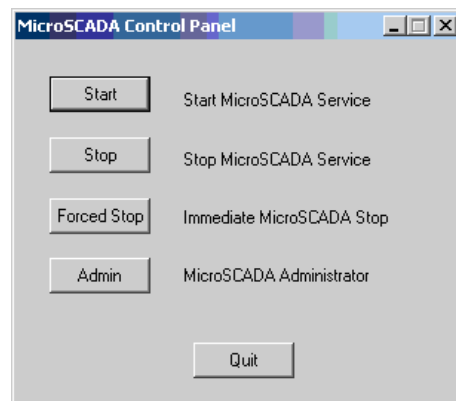
- Reading process object values from the remote terminal units and updating them in the process database (the primary memory).
- Completing and modifying the equipment/line configuration. The command procedure started by APL_INIT_2 can, for example, be programmed to send messages to printers.

3.5.4. Manual startup of SYS 600 Monitor

Manual startup means that MicroSCADA is started manually, from the MicroSCADA Control Panel. If the base system has not been configured for automatic startup, start the MicroSCADA manually.

To start:

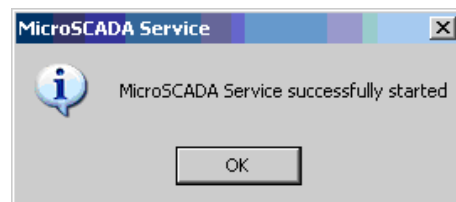
1. Log into the operating system as a user belonging to the Administrator group.
2. Double-click the MicroSCADA Control Panel icon.
3. The MicroSCADA Control Panel is displayed as shown in Fig. 2.1.5.-2.



A051222

Fig. 3.5.4.-1 MicroSCADA Control Panel

4. Click **Start**.
5. The dialog box is displayed as shown in Fig. 3.5.4.-2.



A051223

Fig. 3.5.4.-2 This dialog box tells that MicroSCADA has been started

6. Click **OK**.
7. The application defined in the configuration is started and MicroSCADA VS/X - type monitors are opened to the defined workstations.

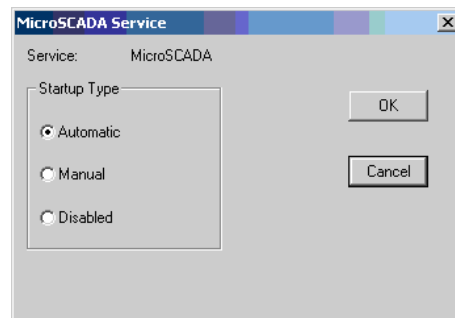
3.5.5.

Defining automatic startup for SYS 600

Automatic startup means that MicroSCADA service is started directly after Windows has been started. No user needs to log in. In addition to automatic startup, automatic logon into Windows can be used and MicroSCADA monitors can be opened automatically.

To define the automatic startup:

1. Open the SYS 600 Control Panel.
2. Click **Admin**.
3. Click **Service**.
4. The dialog shown in Fig. 3.5.5.-1 is displayed on the screen.
5. Select the Automatic Startup type.
6. Click **OK**.



A051229

Fig. 3.5.5.-1 Automatic startup of MicroSCADA is chosen in this dialog

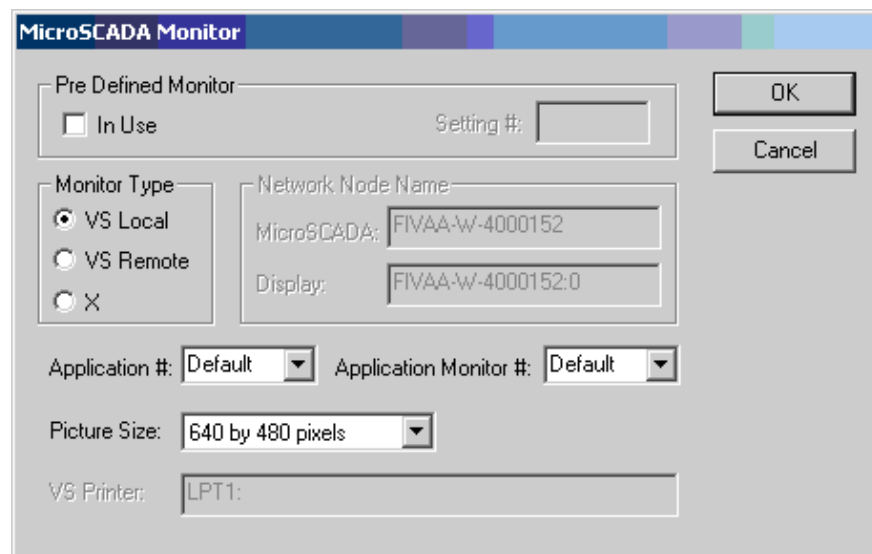
Disabled startup determines that MicroSCADA cannot be started. Disabled startup is also chosen as described above.

3.5.6.

Opening SYS 600 Monitor manually

To define a SYS 600 Monitor for manual opening:

1. Double click the SYS 600 Monitor icon.
2. Define the following:
 - Monitor Type
 - Application number
 - Application Monitor number
 - The size of picture
 - VS Printer - used only with VS Remote monitors



A051226

Fig. 3.5.6.-1 Basic MicroSCADA Monitor (SYS 600 Monitor) Definitions

3. Click **OK**.

The options available to define the monitor include:

Monitor Type: Choose the monitor type you want to open from the following:

- **VS Local**

This is the local Visual SCIL monitor and requires no X emulation software. The MicroSCADA base system must be on the computer from where the MicroSCADA monitor is started.

- **VS Remote**

This is the remote Visual SCIL monitor. It requires an X-server on the computer where the MicroSCADA monitor is to be displayed. The MicroSCADA base system can be on any computer on the network and the MicroSCADA monitor can be opened to any computer on the network, provided that the privileges are sufficient and network configuration allows it.

- **X**

This is the X monitor. It requires an X-server on the computer where the MicroSCADA monitor is to be displayed. The MicroSCADA base system can be on any computer on the network and the MicroSCADA monitor can be opened on any computer on the network, provided that the privileges are sufficient and network configuration allows it.

Application #: Choose the application you want to connect to.

Application Monitor #: Choose the MicroSCADA monitor in the application you want to use.

Picture Size: Choose the picture size to be used in the MicroSCADA monitor.

The possibilities are:

- 640 by 480 pixels
- 960 by 720 pixels
- 1280 by 960
- 1600 by 1200 pixels

Picture size is always 48x80. Semi graphic characters and the sizes of the fonts are:

- 8x10
- 12x15
- 16x20
- 20x25

VS Printer: This property is only used with VS Remote monitors. This printer is used for Visual SCIL screen dumps and the output for the Visual SCIL object VS_PRINT_OBJECT.

Example:

For example the printer LPT1 stands for the local printer using the LPT1: parallel port connected to the MicroSCADA base system computer. You can also give an UNC path to a printer shared on the network. The UNC path to the printer shared as MYPRINTER on the computer MYCOMPUTER is: \\MYCOMPUTER\MYPRINTER.

The MicroSCADA user must have appropriate rights to use the shared printer. The printer defined must be a postscript printer

Opening a Predefined MicroSCADA monitor

To open a predefined MicroSCADA monitor:

1. Select In Use check box.
2. Insert the setting number and the name of the base system computer where the monitors.dat file is. These definitions are described in Section 3.5.8.
Automatically opened MicroSCADA monitors
3. Click **OK**.

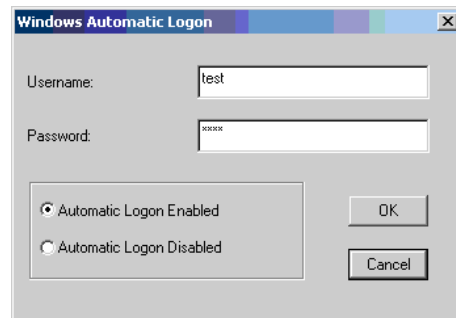
3.5.7.

Automatic logon of SYS 600

Automatic startup means that MicroSCADA service is started directly after the Windows has been started. No user needs to log in. In addition to automatic startup, automatic logon into Windows can be used and MicroSCADA monitors can be opened automatically.

To enable automatic logon:

1. Open the SYS 600 Control Panel.
2. Click **Admin**.
3. Click **AutoLogon**.
4. The dialog shown in the Fig. 3.5.7.-1, is displayed on the screen.



A051230

Fig. 3.5.7.-1 Automatic logon of SYS 600 Monitor

5. Type the user name and the password.
6. Select Automatic Logon Enabled.
7. Click **OK**.

Using Automatic Logon might compromise the security of the MicroSCADA system. To override Automatic Logon, press the SHIFT key during Windows startup. The user is prompted for the user name and password. If the user logs on as a different user than was defined for the Automatic Logon, the Automatic Logon has to be re-enabled from the SYS 600 Control Panel.

3.5.8.

Automatically opened MicroSCADA monitors

When MicroSCADA is started, the monitors can be opened automatically, for example, to the operator workstations.

Predefined MicroSCADA monitors

Predefined monitors (up to 999) can be defined to simplify and automate the startup of MicroSCADA monitors. The MicroSCADA monitors are defined in the file `monitors.dat` located in the `\sc\sys\active\sys_` folder of the base system computer.

To define predefined monitors:

1. Edit the `monitors.dat` file in a text editor. The `monitors.dat` file is described in the following section.
2. Copy a monitor definition block of the required type and change the predefined monitor number to a previously unused number.
3. Modify the block to meet your needs regarding:
 - MicroSCADAmonitor type
 - application
 - logical monitor number

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- semi-graphic font
- display
- print file

To change the font, copy the desired font name of the MicroSCADA monitor type in question from the comment part of the file. When entering a print file name in the file, the name must end with a colon (:).

4. Save the file as an ASCII file.

Monitors.dat

The monitors.dat file is a text file with a specified format. The default monitors.dat file has the following contents:

```
; The comments (lines beginning with ';' ) can be removed.
; NOTE no space character is allowed before and after the equal sign
; The following attributes can be set for the different monitors
;
; VS Local Monitor:
; SCS_MON_TYPE
; LVS
; SCS_MS_WINDOWS_APPLICATION
; 0 - 20 (0 stands for default)
; SCS_MS_WINDOWS_MONITOR
; 0 - 50 (0 stands for default)
; SCS_X_TERMINAL_FONT
; family:MicroSCADA0810-size:10
; family:MicroSCADA1215-size:15
; family:MicroSCADA1620-size:20
; family:MicroSCADA2025-size:25
; FONT
; family:MS Sans Serif-size:8 (default)
; DISPLAY
; (should be empty)
; VS Remote Monitor:
; SCS_MON_TYPE
; RVS
; SCS_MS_WINDOWS_APPLICATION
; 0 - 20 (0 stands for default)
; SCS_MS_WINDOWS_MONITOR
; 0 - 50 (0 stands for default)
; SCS_X_TERMINAL_FONT
; -abb-scada-medium-r-normal-10-100-75-75-c-100-iso8859-1
; -abb-scada-medium-r-normal-15-150-75-75-c-100-iso8859-1
; -abb-scada-medium-r-normal-20-200-75-75-c-100-iso8859-1
; -abb-scada-medium-r-normal-25-250-75-75-c-100-iso8859-1
; FONT
; family:helvetica-size:12 (default)
; DISPLAY
; the name of the display
; PRINTFILE
; the name of the printer to send monitor dumps
; note: the printer "name" must end with a colon
;
; X Monitor:
; SCS_MON_TYPE
; XMON
; SCS_X_TERMINAL_APPLICATION
; 0 - 20 (0 stands for default)
; SCS_X_TERMINAL_MONITOR
; 0 - 50 (0 stands for default)
; SCS_X_TERMINAL_FONT
; -abb-scada-medium-r-normal-10-100-75-75-c-100-iso8859-1
; -abb-scada-medium-r-normal-15-150-75-75-c-100-iso8859-1
; -abb-scada-medium-r-normal-20-200-75-75-c-100-iso8859-1
; -abb-scada-medium-r-normal-25-250-75-75-c-100-iso8859-1
; DISPLAY
; the name of the display
[ 1]
SCS_MON_TYPE=LVS
SCS_MS_WINDOWS_APPLICATION=0
SCS_MS_WINDOWS_MONITOR=0
SCS_X_TERMINAL_FONT=family:MicroSCADA0810-size:10
DISPLAY=
```

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```
[ 2]
SCS_MON_TYPE=RVS
SCS_MS_WINDOWS_APPLICATION=0
SCS_MS_WINDOWS_MONITOR=0
SCS_X_TERMINAL_FONT=-abb-scada-medium-r-normal-15-150-75-75-c-100-iso8859-1
DISPLAY=localhost:0
PRINTFILE=LPT1:
[ 3]
SCS_MON_TYPE=XMON
SCS_X_TERMINAL_APPLICATION=0
SCS_X_TERMINAL_MONITOR=0
SCS_X_TERMINAL_FONT=-abb-scada-medium-r-normal-15-150-75-75-c-100-iso8859-1
DISPLAY=localhost:0
```

The first part of the file is composed of comments. The three blocks in the latter half of the file define three MicroSCADA monitors numbered 1, 2 and 3. MicroSCADA monitor number 1 is of type “Local VS” and it uses the smallest semi-graphic font (scada810). MicroSCADA monitor number 2 is of type “Remote VS”. It is also to be shown on the base system. It uses the medium size semi-graphic font (scada1215).

All MicroSCADA monitors will be connected to the default application and given default logical monitor numbers. MicroSCADA monitor number 3 is an “X” type monitor to be shown on the base system screen. It uses the medium size semi-graphic font (scada1215).

The monitors.dat file can include for example the following lines (for VS objects):
 FONT=family:MS Sans Serif-size:8. When the user wants to use these definitions from monitors.dat, mons must be started with -d -option.



The predefined monitors numbered 1, 2 and 3 are examples and can be removed from the monitors.dat file.

3.5.9.

Defining customized icon for SYS 600 monitors

To define an icon for opening a SYS 600 Monitor with predefined properties without using the MicroSCADA Monitor dialog box:

1. Define a predefined monitor in the base system where the application is located.
2. Copy the original SYS 600 Monitor icon.
3. Edit the properties of the new icon by changing the target line. This can be done by choosing the properties of the icon/program. Insert the command for opening a predefined monitors by setting the following flags -d for the predefined monitor and -r for retries. See the example below.

Example:

```
mons -r 4 -d mycomp 4
```

The command opens the predefined monitor number 4 on the base system computer mycomp. By stating retries with the -r flag the program tries again if the network initialization has not finished when the monitor is requested. The retries are made every 5 seconds as many times stated after the flag.

3.5.10.**Automatic opening at application startup**

A MicroSCADA monitor should be configured to be opened automatically at application startup if the MicroSCADA monitors are to be opened to an operator workstation but the Windows in the same computer is not logged into.

To configure a MicroSCADA monitor to be opened automatically at the startup of an application:

1. Define a predefined monitor in the base system computer as described in Section 3.5.8. Automatically opened MicroSCADA monitors.
2. Insert the SCIL function OPS_PROCESS or OPS_CALL with the command for starting a predefined monitor.



By using the -n flag MicroSCADA knows that the monitor request was given from within MicroSCADA. If an error occurs, the error message will not be displayed on the screen. It is put in the event log of the operating system. If you use the -n flag, the MicroSCADA monitor properties must be predefined. If a MicroSCADA monitor is started from within MicroSCADA and the monitor is to be displayed on the base computer screen, there must be a user logged on.

Example:

```
@OPS = OPS_CALL ("mons -n -d mycomp 4", 1)
```

The command opens the predefined monitor number 4 defined on the base system computer mycomp. The '-n' flag should be used when opening the MicroSCADA monitor from within MicroSCADA. The -fl, -fr and -s parameters cannot be used together with the -d parameter and the -n parameter can only be used with the -d parameter. The predefined monitors numbered 1, 2 and 3 are examples and can be removed from the monitors.dat file.



The X-server program should not be started from within MicroSCADA using OPS_CALL. Use the Startup folder for starting the X-server or start the X-server manually. If the MicroSCADA monitor requires the X-server program, the X-server should also be started from the Startup folder.

3.5.11.**Automatically opened MicroSCADA monitor at user login**

To configure a MicroSCADA monitor to be opened automatically when a user logs on to Windows:

1. Define a MicroSCADA monitor in the base system as described in Section 3.5.8. Automatically opened MicroSCADA monitors.
2. Copy a MicroSCADA Monitor program icon into the Startup folder of the user.
3. Change the target line (found by choosing the properties of the icon/program) by setting the following flags -d for the predefined monitor and -r for retries. See the example below.

Example:

```
mons -r 4 -d mycomp 4
```

The command opens the predefined monitor number 4 on the base system computer mycomp. By stating retries with the -r flag the program tries again if the network initialization has not finished when the MicroSCADA monitor is requested. The retries are made every 5 seconds as many times stated after the flag.

If the MicroSCADA monitor requires the X-server program, the X-server should also be started from the Startup folder.

Table 3.5.11.-1 Parameters of the Mons Program

Parameter	Description
-d mycomp x	where mycomp = computer name and x = number of predefined monitors. Use this parameter when predefined monitor is to be opened.
-n	Non-interactive; Use this parameter when monitor is opened from within MicroSCADA.
-r n	Number of retries, where n = integer
-fl font_local	where font_local is the font to be used in VS local monitors. For example "family:MS Sans Serif-size:12".
-fr font_remote	where font_remote is the font to be used in VS remote monitors. For example "family:Helvetica-size:12".
-s n	Picture size value in the MicroSCADA monitor dialog, where n = integer, 1...4.
-start_serv	If this parameter is given, MicroSCADA service is started automatically during monitor start if service is not already started. The dialog box informing that MicroSCADA service is started successfully is not shown, when this parameter is used.

Table 3.5.11.-1 Parameters of the Mons Program (Continued)

Parameter	Description
-serv_create_dir_disabled	If this parameter is given, no directories are created during MicroSCADA service startup. This means that, for example, with current SYS 500 default installation, directories "Form" and "Pic" are not created under application directories. This parameter can only be used with "-start_serv" parameter.
-start_as_logon_user	With this parameter the monitor is started as logged-in user's context.  Only VS Local monitors can be started with this parameter.
-default	With this parameter a monitor with default properties is opened. Properties are: Monitor type: VS Local Application #: 0 Application Monitor #: 0 Font: family:MicroSCADA0810-size:10 VS Printer: LPT1

3.5.12.**Starting base systems from command line**

Base systems can be started by running the ms_serv.exe program together with the parameters described in Table 3.5.11.-1. The ms_serv.exe is located in sc\prog\exec\ folder. The MicroSCADA service can be started, for example from the operating system command prompt with the following command line:

```
ms_serv -start
```

When running this command line from the command prompt, the working directory should be the same as the file's location, which in this case is the sc\prog\exec.

Several parameters can be combined into one command line, for example in the following way:

```
ms_serv -start -no_create_dir -no_info_dialog
```

In this example the command line starts the base system, prevents the creation of additional directories such as "Form" and "Pic" during the startup, and prevents displaying the info dialog box telling if MicroSCADA is started successfully.

Table 3.5.12.-1 Parameters of the ms_serv.exe

Parameter:	Description:
-start	With this parameter MicroSCADA service is started.
-stop	With this parameter MicroSCADA service is stopped.
-forced_stop	With this parameter MicroSCADA service is forcibly stopped.
-no_create_dir	If this parameter is given, additional directories such as "Form" and "Pic" are not created under application directories during service start-up. This parameter can only be used with "-start".
-no_info_dialog	If this parameter is given, the info dialog telling if MicroSCADA is started or stopped successfully is not shown.

Table 3.5.12.-1 Parameters of the ms_serv.exe (Continued)

Parameter:	Description:
------------	--------------

The service start and stop access can be granted only for user-defined groups and "Users" group.

The following groups are not granted access:

- Power Users
- Back-up Operators
- Guests
- Replicator

This is because the MicroSCADA monitor and notify window, can only be opened by users belonging to the following groups:

- Administrators
- Users

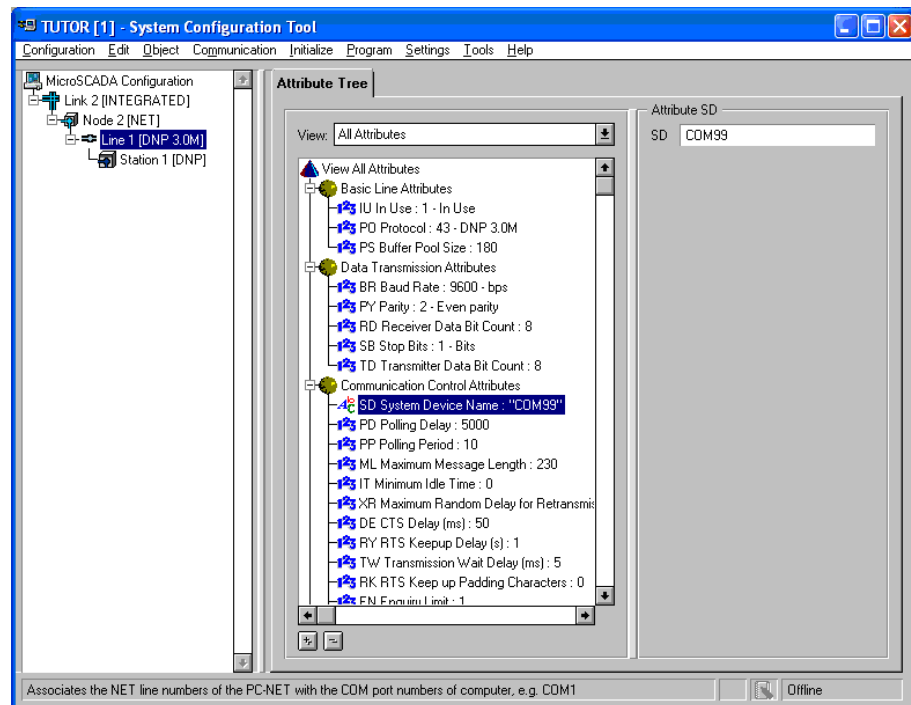
3.5.13.

Starting PC-NET

In the normal situation, the PC-NET process communication units need not to be separately started but they are started automatically if the system configuration contains NET nodes. In system startup, the PC-NET starting should be seen from the notification window as described in Section 2.6.1.4. Verifying PC-NET process communication unit.

The system configuration tool as shown in Fig. 3.5.13.-1 provides a possibility to start and stop PC-NET instances during runtime. This feature is useful when the system is under testing and the configuration changes has been done. In normal use of a MicroSCADA Pro system, this function is not needed and PC-NET processes are running without interruptions.

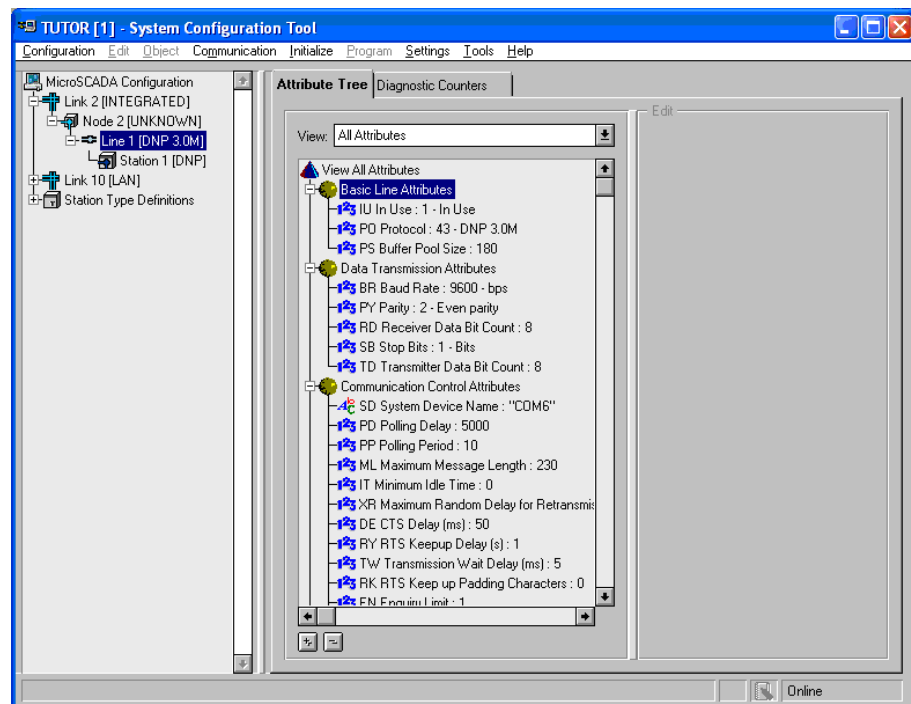
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Fig. 3.5.13.-1 System configuration tool

When PC-NET process is running, on-line configuration changes can be done in online mode by selecting **Configuration>Open On-line**. In this mode, the background of the dialog is purple.



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Fig. 3.5.13.-2 System configuration tool

If the online mode does not show all NET nodes which are configured and saved, most probably the corresponding PC-NET process has not been started and the notification window (and “sys_error.log” file) contains related error messages.

3.5.14. Shutting down SYS 600

To stop MicroSCADA:

1. Close all monitors.
2. Open the MicroSCADA Control Panel.
3. Click **Stop**.
4. The dialog box shown in Fig. 3.5.14.-1 is displayed.



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Fig. 3.5.14.-1 Stopping service confirmation dialog box

5. Click **Yes**.
6. The dialog box shown in Fig. 3.5.14.-2 is displayed, when the applications have been closed.



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Fig. 3.5.14.-2 Shutting down SYS 600

7. Click **OK**.

MicroSCADA can also be stopped using Forced Stop. This function is only to be used when the MicroSCADA system is not stable and has to be ended fast. However when the shutdown sequence has started there is no way of changing the operation. The procedure of closing by force should not take longer than 15 seconds.



Do not shut down the base system computers simply by switching off the power, because this might damage the MicroSCADA system files.

3.5.15.**Backup files**

With Backup Tool you can make an online backup of the MicroSCADA application. MicroSCADA is running while the backup is made.

This tool makes a backup of the main application, not of the whole MicroSCADA. In other words, it makes a backup of everything located under '\SC\APL\main application name'.

This means that you always need a second backup of \SC, if you change SYS_BASCON.COM or other files located outside the application.

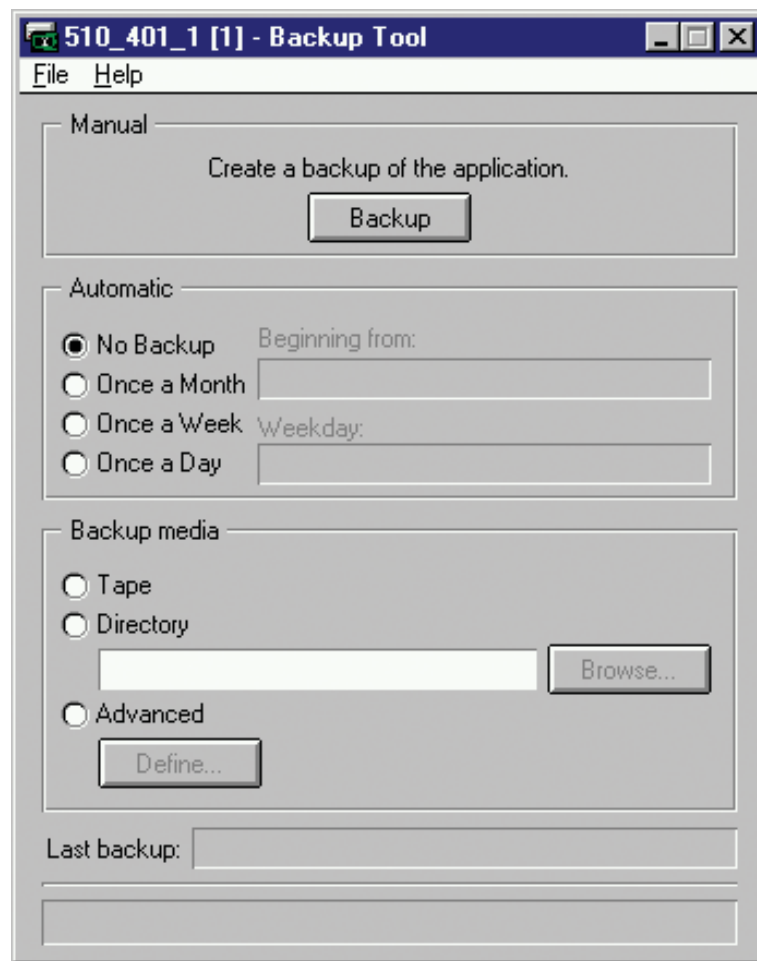
This backup makes a shadow of the application in an other application (shadow application). In normal use the shadow application is passive.

When the backup starts, it removes all the files in the shadowing application and after that, it copies files from the main application to the shadowing application.

If some changes are made on files, which are already copied, it copies them again. When the copying is ready, it freezes the shadow application and starts to copy the shadow application to the tape or to some other media.



This tool is meant to be used for making an online backup in the single MicroSCADA system. This is not meant for the online backup functionality in the redundant (HSB) MicroSCADA systems.



A051197

Fig. 3.5.15.-1 Main view of the Backup Tool

3.5.15.1. Creating online backup

This section provides information on how to use the backup function.

Manual Backup:

Click **Backup** in the Backup Tool window shown in Fig.3.5.15.-1, and after that click **Yes**. The procedure takes about 1 1/2 hour with a medium application with reporting.

When you start a manual backup from this tool, it will trigger the command procedure BCK_START, which starts the backup.

Auto Backup:

When No Backup is selected in the Backup Tool window shown in Fig.3.5.15.-1, no automatic backup is made. If Once a month is selected, the time channel BACKUP_1 activates the start of backup.

If Once a week is selected, the BACKUP_2 activates the start of backup, and if Once a Day is selected then BACKUP_3 activates the start of backup.

As default, the time channels are started as shown in Table 3.5.15.1.-1. If there is a need to change the time, it can be done with the Time Channel Tool, which is opened from the application object navigator.

Table 3.5.15.1.-1 Backup time channels

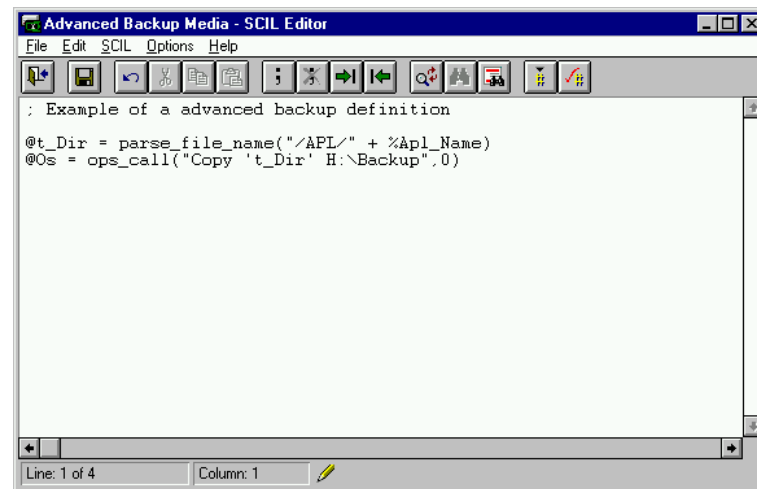
BACKUP_1	First day every month at 00:10 (once a month)
BACKUP_2	Every Friday at 18:01 (once a week)
BACKUP_3	Every day at 00:10 (once a day)

Backup Media:

It is possible to select where the application backup is created. When you select the Tape, it will be the Windows Backup, which creates a backup of the backup application to a tape.

If the Directory is selected, the backup application is copied in that directory. The directory definition should be in the operating system format.

If Advanced is selected, it is possible to define a SCIL program, which creates the backup.



A051198

Fig. 3.5.15.1.-1 Example of a advanced backup definition.

General:

When Backup has been started, this tool can follow the shadowing of the main application to the backup application.

When the shadowing is ready, and the backup creation command has been executed, it shows the following message, "Shadowing is ready. Backup will be created by operating system".

This means that this tool does not have any connection to the creation of the backup, which is normally made by the operating system tools like Windows Backup.

In the lower part of the tool dialog, there is an info bar, which shows different system messages. One of the fields shows when the last backup has been made.

During the installation, the standard template file, sys_bascon.bck, to be used together with online backup functionality is installed into the \sys\active\sys_ folder.

3.5.15.2. Configuring Backup Tool

The configuration of Backup Tool requires the following steps:

1. Stop MicroSCADA
2. Copy the Sys_Bascon.bck to be the Sys_Bascon.com. The following definitions in Sys_Bascon.com are important for the shadowing and backup procedures. See Sys_bascon.bck in \sys\active\sys_ folder.
3. Define the system node name, main application name and application numbers.



Normally the main and watchdog application can be the same.

```
@SYSTEM = "SYS_A"           ; System node name or TCP/IP address
@APL_NAME = "TUTOR"         ; Name of main application
@APL_NUMS = (1,1,3)         ; Application numbers in the following order:
(Main, Watch-dog, Backup), application number must be <= 10
```

Base system shadowing must be set in use:

```
#CREATE SYS:B = List (-
  SA = 209, -                ; Station address of base system
  ND = 9, -                  ; Node number of base system
  SH = 1, -                  ; SHADOWING ENABLED
  DN = 1, -                  ; Default NET node number
...

```

LAN link is needed:

```
#CREATE LIN:V = LIST (-      ; Link to other SYS or LAN frontend (requires
TCP/IP)
LT = "LAN")                  ; Link type
#CREATE LIN2:B = %LIN
```

Base system node is needed:

```
#CREATE NOD:V = LIST (-      ; Node for Base System
NN = %System, -
LI = 2, -
SA = 209)
#CREATE NOD9:B = %NOD
```

- Main and watchdog applications must have at least 2 parallel queues.
- Main and backup applications must have the shadowing attributes defined correctly.

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- Main and watchdog applications must be set to HOT state, and the backup application to COLD.
- Application mapping must be made in main, watchdog and backup applications.

```
#CREATE APL:V = LIST(-      ; ** Main Application **
  TT = "LOCAL",-           ; Translation Type
  NA = %APL_NAME,-         ; Name of application directory
  AS = "HOT",-             ; Application state (COLD, WARM, HOT)
  PQ = 2,-                 ; Number of parallel queues
  SN = %APL_NUMS(3),-      ; SHADOW APPLICATION
  SW = %APL_NUMS(2),-      ; SHADOW WATCHDOG
  SC = 240,-               ; SHADOW MAXIMUM CONNECTION TIME IN SECONDS
  ...
#LOOP WITH I = 1 .. LENGTH(%APL_NUMS)
@NUM = %APL_NUMS(%I)
#SET APL:VAP(%NUM) = %NUM
#LOOP_END
```

This watchdog application is not needed, if the main and watchdog applications are combined by selecting the watchdog application number to be the same as for the main application in vector "@APL_NUMS", in the beginning of the Sys_Bascon.com.

```
#CREATE APL:V = LIST(-      ; ** Watch dog Application **
  TT = "LOCAL",-           ; Translation Type
  NA = "WD",-              ; Name of application directory
  AS = "HOT",-             ; Application state (COLD, WARM, HOT)
  PQ = 2,-                 ; Number of parallel queues
  ...
#LOOP WITH I = 1 .. LENGTH(%APL_NUMS)
@NUM = %APL_NUMS(%I)
#SET APL:VAP(%NUM) = %NUM
#LOOP_END
```

4. Create a backup application:

```
#CREATE APL:V = LIST(-      ; ** Backup Application **
  TT = "LOCAL",-           ; Translation Type
  NA = SUBSTR("BCK" + %APL_NAME,1,8),- ; Name of application directory
  AS = "COLD",-            ; Application state (COLD, WARM, HOT)
  SN = %APL_NUMS(1),-      ; Shadow application = Main application
  SW = %APL_NUMS(2)-       ; Shadow watchdog
  ...
#LOOP WITH I = 1 .. LENGTH(%APL_NUMS)
@NUM = %APL_NUMS(%I)
#SET APL:VAP(%NUM) = %NUM
#LOOP_END
```

5. Create a backup application with the MicroSCADA control panel.
6. Set the name to BCK, plus five first characters of the main application name (see the backup application definition in Sys_Bascon.com).

The name can also be something else, but it has to be the same as defined in the Sys_Bascon.com file.

7. Start MicroSCADA.
8. Enter a Base system tool picture and select Base Object, (SYS), then select **Tools>HSB Management**. Check if the shadowing object manager is installed. If not, Click **Install** to install package.

This will create all the command procedures needed for the shadowing management.

9. Enter this backup tool and select **File > Save**. Then it asks you to modify the backup command procedure name from SHADBACKUP to BCK_CREATE.

This creates the line @BCK_PROC = "BCK_CREATE" in the SHADGLOBAL command procedure.

10. Select **File > Save** again, and it asks you to create the following objects:

```
BCK_START:C
BCK_CREATE:C
BACKUP_1:T
BACKUP_2:T
BACKUP_3:T
```

3.5.15.3.

Testing new configuration

A new configuration can be tested as follows:

- Click the **Backup** button and check that the shadowing function is working correctly.
- Select Base system from the tool picture and check that the shadowing on applications is sending and transmitting correctly.
- Watch the Notify window in case there are some error messages.
- If something has gone wrong and the shadowing does not stop, change the shadowing state in the Basesystem Configuration Tool to "NONE" for both main and backup application.

3.5.16.

Uninstalling MicroSCADA

At the moment there is no uninstall program in MicroSCADA releases. The following items have to be deleted when uninstalling MicroSCADA.



Please note that the control set numbering may vary in different computers.

Delete the following:

1. \sc directory (and subdirectories)
2. Service (only, if CAP 50x/SMS510 are not installed into the same computer, otherwise those products do not work)

(KEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services
\MicroSCADA)

(HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Services
\MicroSCADA)

(HKEY_LOCAL_MACHINE\SYSTEM\ControlSet003\Services
\MicroSCADA)

Use uninstall program of the services, if possible

3. MicroSCADA group from start menu
4. Shortcut to MicroSCADA group on desktop
5. Following fonts from Windows font directory:

scada0810.fon

scada1215.fon

scada1620.fon

scada2025.fon

scalo0810.fon

scalo1215.fon

scalo1620.fon

scalo2025.fon

abb10.fon

abb14.fon

abb18.fon

6. Package & Product information from registry:

HKEY_LOCAL_MACHINE\SOFTWARE\ABB\PAK\SYS_600\..

KEY_LOCAL_MACHINE\SOFTWARE\ABB\Products\SYS_600\..

7. Driver information from registry:

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Services\...Driver

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Services\EventLog
\System\.. Driver

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\...Driver

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\EventLog
\System\...Driver



The drivers are named starting with letters "MiSC" (MiSCAlrm, MiSCRAM...).

8. Misc event log information from registry:(only, if CAP 50x/SMS510 are not installed into the same computer, otherwise those products do not work.)

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\EventLog
\Application\MicroSCADA

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Services\EventLog
\Application\MicroSCADA

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet003\Services\EventLog
\Application\MicroSCADA

9. Path definitions (this one is needed for older MicroSCADA product versions):

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\Environment\ key "MS_SYS"

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Control\Session Manager\Environment\ key "MS_SYS"

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet003\Control\Session Manager\Environment\ key "MS_SYS"

sc\prog\exec from

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\Environment\ key "Path"

sc\prog\exec from

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Control\Session Manager\Environment\ key "Path"

sc\prog\exec from

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet003\Control\Session Manager\Environment\ key "Path"

Please note the following, when uninstalling MicroSCADA:

- Wserver-process should be killed first. (only, if CAP 50x/SMS510 are not installed)
- Starting of Wserver should be removed also from the Startup folder. (only, if CAP 50x/SMS510 are not installed)
- Service should be uninstalled second. This should be done before deleting sc-directory, because service can be uninstalled with the command "servinst -r". (only, if CAP 50x/SMS510 are not installed)
- MicroSCADA fonts from Exceed -directory should be removed too.
- MicroSCADA user should be removed too. (only, if CAP 50x/SMS510 are not installed)

In the directory HKEY_LOCAL_MACHINE\SOFTWARE\ABB the following keys:

HKEY_LOCAL_MACHINE\SOFTWARE\ABB\PAK\SYS_500

HKEY_LOCAL_MACHINE\SOFTWARE\ABB\Products\SYS_500

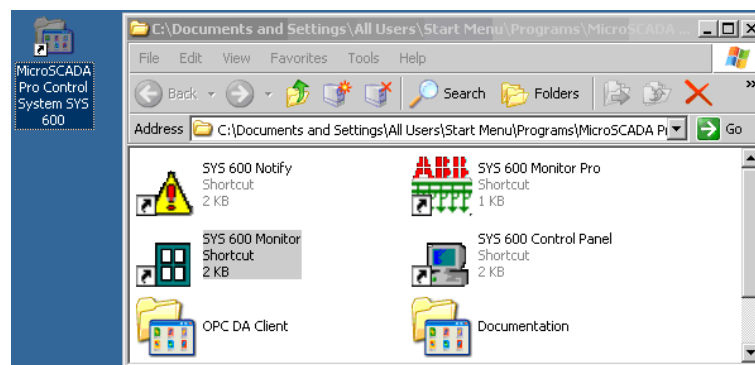
HKEY_LOCAL_MACHINE\SOFTWARE\ABB\Products\Common\MS-SBASE (this key only if CAP 50x/SMS510 are not installed)

3.6. Verifying SYS 600 startup

Follow this procedure when starting up the entire SYS 600 system:

1. If not already running, start the process units as described in their respective manuals.
2. Start the remote communication equipment, modems, etc.
3. Start the printers by switching the power on.
4. Switch on the workstations, so that MicroSCADA monitors can be opened automatically.
5. Start the base systems. If there are hot stand-by (redundant) base systems, start both the hot and stand-by base systems.
6. Start the communication frontends. If there are redundant frontends, start both the hot and stand-by frontends.
7. Open the MicroSCADA monitors that are not opened automatically.
8. Log into the application.

During the installation of the SYS 600 software, a MicroSCADA Control System SYS 600 icon is created, in which you will find links to available tools. Refer to the Fig. 3.6.-1 given below.



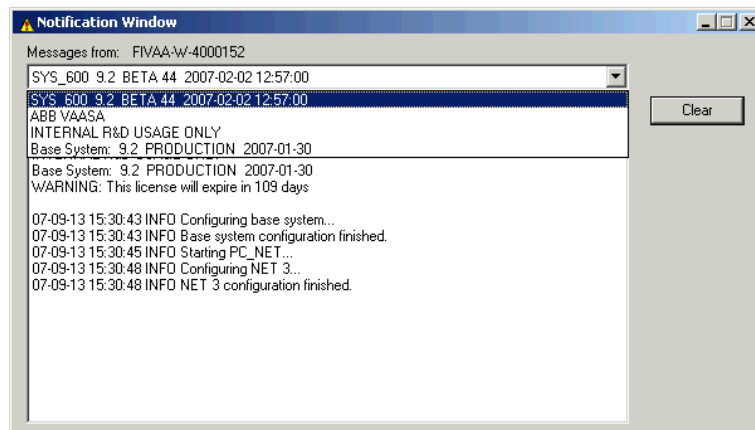
A070495

Fig. 3.6.-1 Links to available tools

In addition to MicroSCADA kernel software, two empty applications named TUTOR and WD are also created. You can verify the start of MicroSCADA SYS 600, MicroSCADA and SYS 600 Pro Monitor without any further editing, by opening the SYS 600 Notify window shown in Fig. 3.6.-2 to see information messages and the possible reasons for failure.

Software revision information is available in the Notification Window.

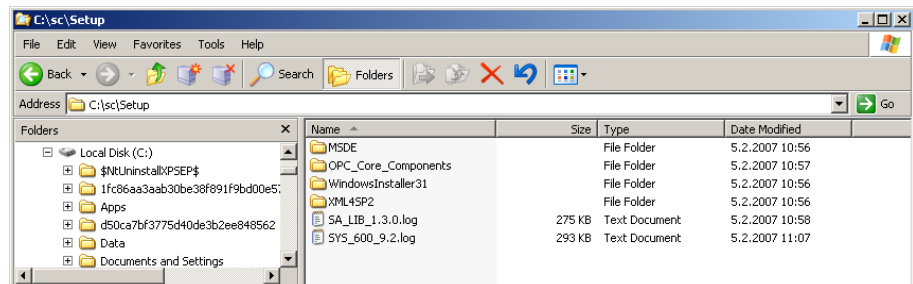
Installation and Administration Manual



A070497

Fig. 3.6.-2 Notification window

More information of installed MicroSCADA software is available in .log files under sc\Setup directory as shown in Fig. 3.6.-3.

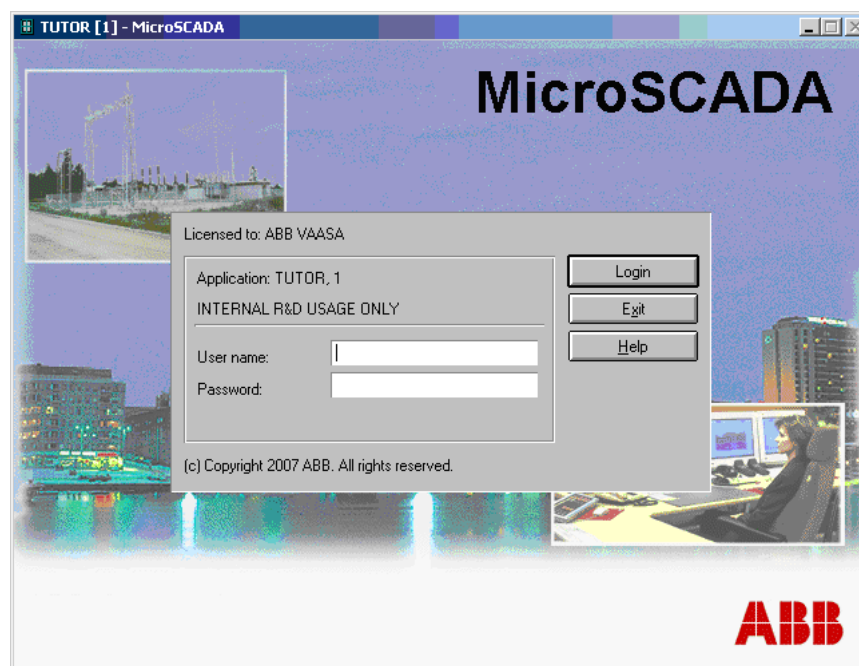


A070741

Fig. 3.6.-3 Revision info

To verify the start of MicroSCADA SYS 600, MicroSCADA and SYS 600 Pro Monitor:

1. Open SYS 600 Control Panel.
2. Click **Start**.
3. Click **OK** in opened window.
4. Double click MicroSCADA Icon.
5. Log into TUTOR application using the dialog shown in Fig. 3.6.-4 by typing in the user name and password. For example: tutor, tutor.

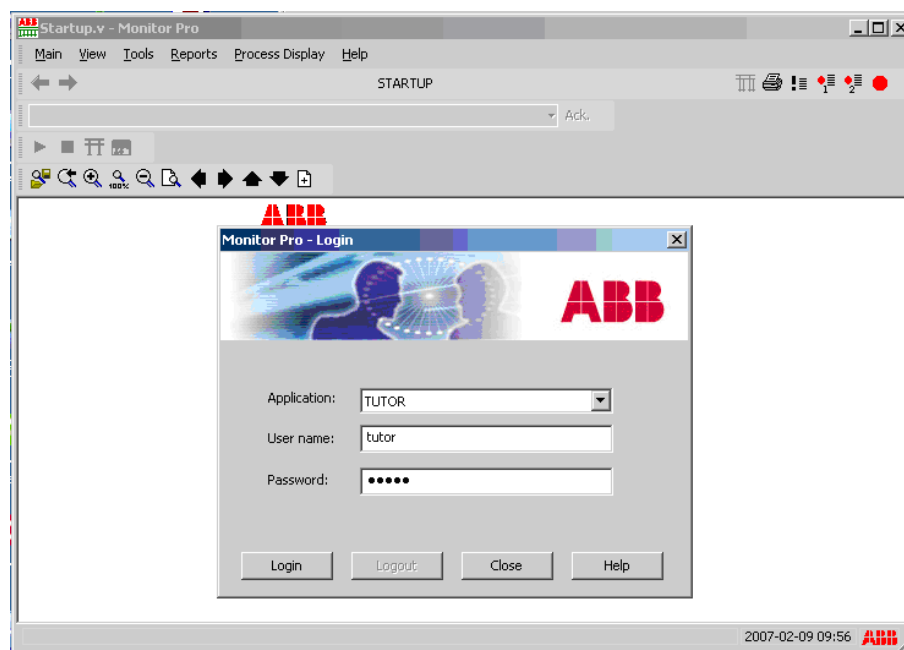


A070496

Fig. 3.6.-4 Tutor application login dialog

SYS 600 Monitor Pro

To open Monitor Pro locally, double click the SYS 600 Monitor Pro Icon. The Monitor Pro Login window opens as shown in Fig. 3.6.-5



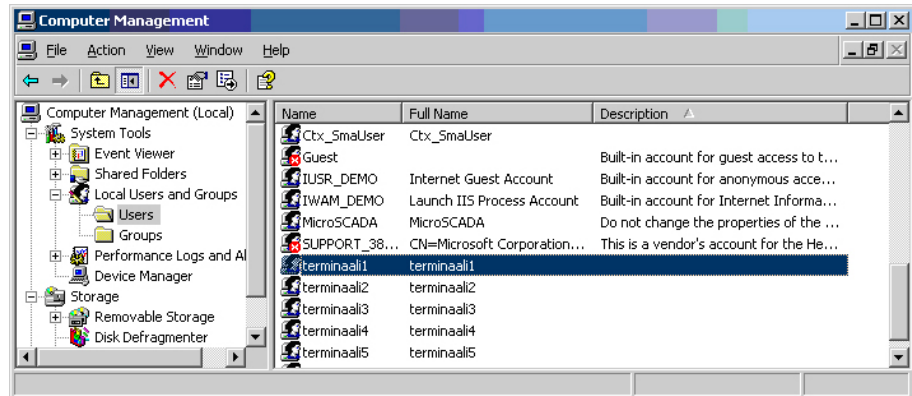
A070498

Fig. 3.6.-5 Monitor Pro Login dialog

3.7. SYS 600 Monitor Pro Remote Connection

Pro remote connection means that MicroSCADA Pro monitor is not opened on the SYS but on a separate PC. To establish a connection between MicroSCADA base system and workstation on which the Pro type monitor is opened, the following steps are needed:

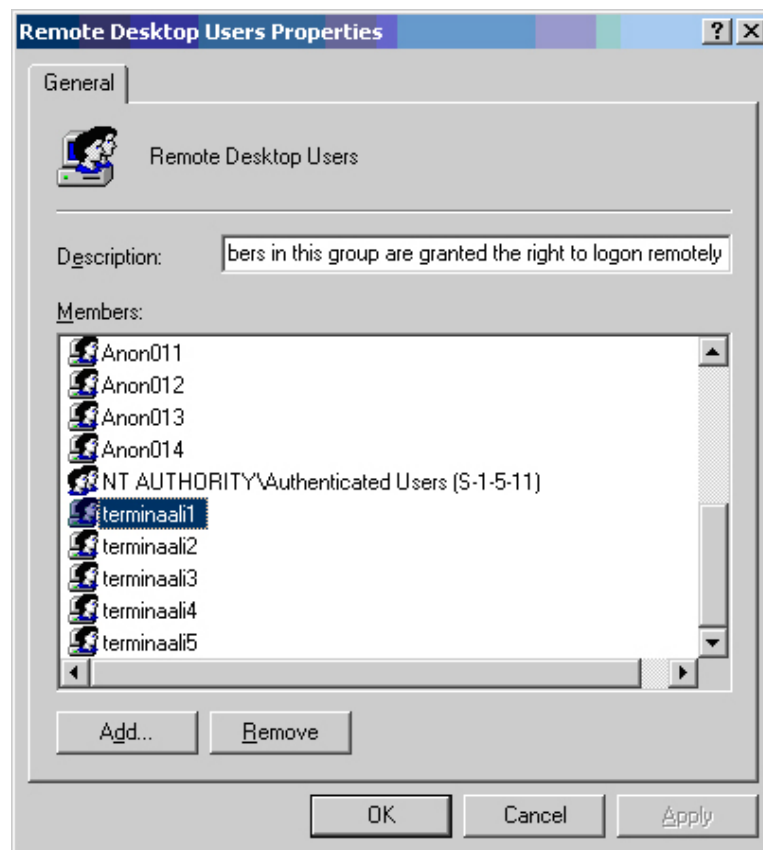
To establish SYS 600 Monitor Pro remote connection:



A070499

Fig. 3.7.-1 Computer management window

1. Create a user to the MicroSCADA Pro server which is running Terminal Services and licensing service. Licensing service must be available in the same PC or in the same network in another PC.
2. Open Computer Management and select Local Users and Group/Users Action/ New User as shown in Fig. 3.7.-1.
3. Add created Users to Remote Desktop Users Group in the Remote Desktop User Properties dialog shown in Fig 3.7.-2.

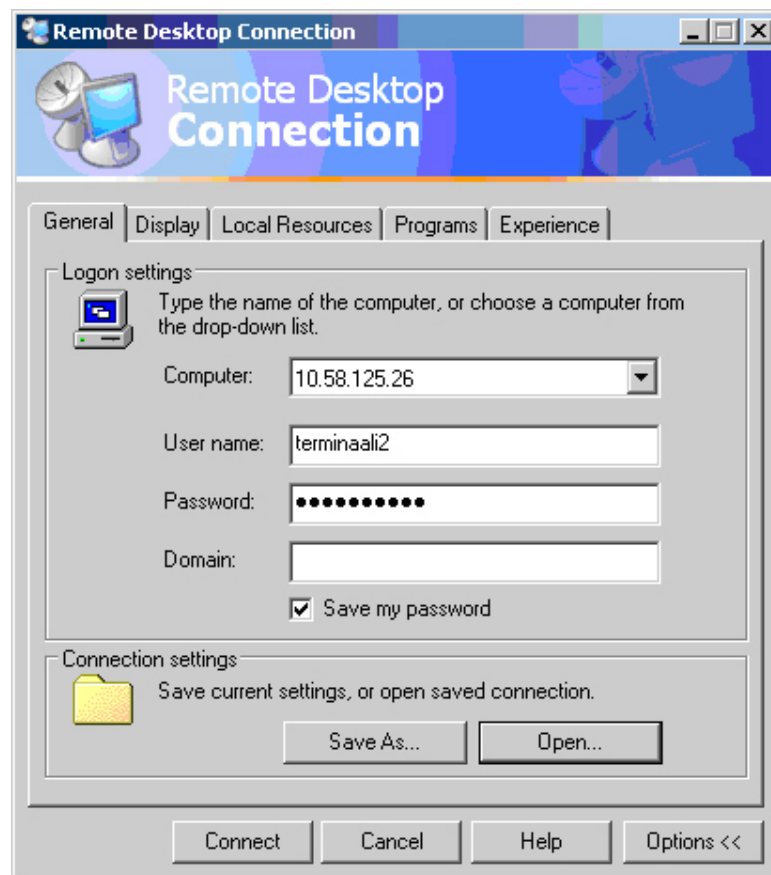


A070506

Fig. 3.7.-2 Remote Desktop User Properties dialog



Note: Before starting SYS 600, remember to edit and execute MMC500_TS.cmd which lies under \sc\prog\exec.

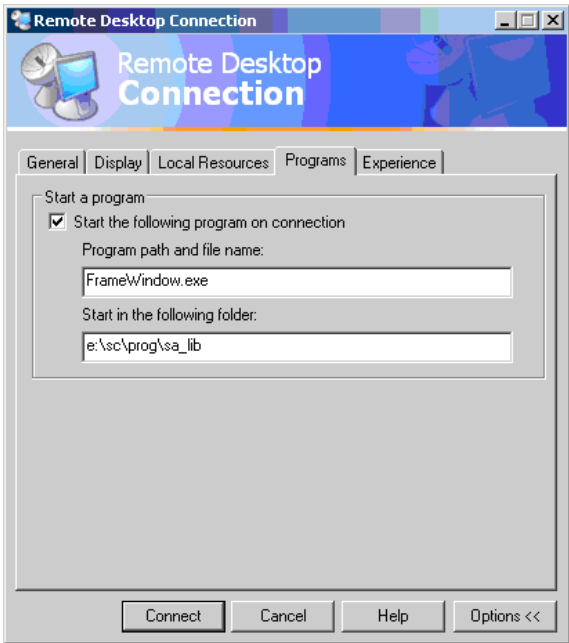


A051183

Fig. 3.7.-3 Remote Desktop Connection General dialog

On the client side:

1. Open Remote Desktop Connection from programs/Accessories/Communications.
2. Select options like Display properties and programs that you want to start when connecting as shown in Fig. 3.7.-3 and Fig. 3.7.-4.
3. If Start a program is deselected a desktop is shown. Type the name of Computer then press **Connect**.

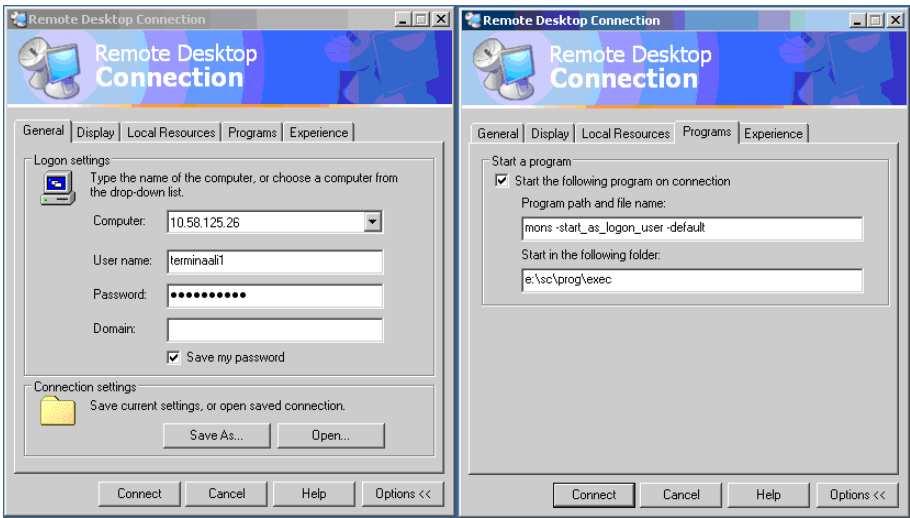


A051186

Fig. 3.7.-4 Remote Desktop Connection Programs dialog

SYS 600 Monitor Remote connection

Terminal Services can be utilized also when using VS type monitor. On client side, Open Remote Desktop Connection and input parameters. Set **Start a program** as shown in Fig. 3.7.-5.



A070503

Fig. 3.7.-5 SYS 600 Monitor Remote Connection

Mons.exe program is started with parameter `-start_as_logon_user` and `-default`. SYS 600 Monitor is installed on volume `e:\`.

4. Upgrading from earlier revisions

This chapter describes upgrading information related to the base system, communication system and LIB 500 system.

Previous and current program packages available for MicroSCADA usage are shown in Table.4.-1.

Table 4.-1 Previous and current program packages available for usage

SYS revision	Base LIB revision	Application library revision
SYS 600	LIB 500 4.2	LIB 510 4.2 LIB 520 4.1 LIB 530 4.0.4 LIB 542 4.0.5
	LIB 500 4.1	LIB 510 4.1 LIB 520 4.1 LIB 530 4.0.4 LIB 542 4.0.5
SYS 500 8.4.4 SP1 or newer	LIB 500 4.2	LIB 510 4.2 LIB 520 4.1 LIB 530 4.0.4 LIB 542 4.0.5
	LIB 500 4.1	LIB 510 4.1 LIB 520 4.1 LIB 530 4.0.4 LIB 542 4.0.5
	LIB 500 4.0.5	LIB 510 4.0.5 LIB 520 4.0.4 LIB 530 4.0.4 LIB 542 4.0.5
SYS 500 8.4.4 or newer	LIB 500 4.0.4	LIB 510 4.0.4 LIB 520 4.0.4 LIB 530 4.0.4 LIB 542 4.0.4

Application Libraries:

- LIB 510 Application Library for Medium Voltage process
- LIB 520 Application Library for High Voltage process
- LIB 530 Application Library for High Voltage process
- LIB 542 Application Library for Medium Voltage process

4.1. Base system

From the base system point of view, no modifications to the application are required to start it after the installation. However, there are some issues to be considered to make the application work exactly as before (or better):

- The configuration file templates SYS_BASCON\$COM, SYS_BASCON.HSB, SYS_CONFIG\$PAR and SHUTDOWN\$CIN should be merged to the corresponding old application files SYS_BASCON.COM, SYS_CONFIG.PAR and SHUTDOWN.CIN to enable new features introduced in newer revisions. The configuration files are described in the System Configuration manual.
- During the development of the product some errors have been fixed in a way that may have influence on the old applications that have relied on the error. In addition, the default behavior in some situations, often related to event and alarm handling, have been changed. The Revision Compatibility mechanism, implemented as the RC attribute of the application object (see the System Objects manual) and the REVISION_COMPATIBILITY function (see the Programming Language SCIL manual), may be used to keep the old behavior.

In the following sections, the most important revision compatibility switches to be considered at the upgrade are described. They are listed in the reverse order of the revision of the old system. For example, if the system is upgraded from 8.4.3 to 9.2, the sections down to 4.1.3 are relevant.

If the system to be upgraded is running an operating system other than Windows (Unix or iRMX), please consult our SA-D Support Line for the details of the upgrade.

4.1.1.

Mirroring considerations

If mirroring is used in the system to be upgraded, it is recommended that the MicroSCADA Pro Hotfix MSH07-001 is applied after the installation of SYS 600 9.2.

If the system works as a mirroring host and any of its images run revision 8.4.5 or older, the hotfix is mandatory to even make the mirroring work.

If the system to be upgraded is or is going to be a part of a mirroring network, the compatibility switch "844_COMPATIBLE_MIRRORING" must be set in the following two cases:

- There is a system running revision 8.4.4 in the network.
- "844_COMPATIBLE_MIRRORING" is set in the other systems of the network.

844_COMPATIBLE_MIRRORING

Mirroring between revision 8.4.4 and any later revision does not work when default settings are used. When upgrading from 8.4.4, both the host system and the image system has to be upgraded to make mirroring work again.

Compatibility switch "844_COMPATIBLE_MIRRORING" has been implemented to make it possible to upgrade systems of the mirroring network one by one.

When "844_COMPATIBLE_MIRRORING" is set (in revision 8.4.5, or later), the mirroring works with an 8.4.4 application, and also with a newer application that has specified "844_COMPATIBLE_MIRRORING". However, it does not work with an 8.4.5 or later application without "844_COMPATIBLE_MIRRORING".

Using "844_COMPATIBLE_MIRRORING", the upgrading can be done system by system without disturbing the operation of the network. In this case, each new node that is added to the network later must set "844_COMPATIBLE_MIRRORING" as well.

The setting of "844_COMPATIBLE_MIRRORING" does not affect the functionality of the program or cause any decrease in performance.

4.1.2.

Upgrading from revision 8.4.5 SP1 or 9.0

COUPLE_AUDIO_ALARMS_AND_PRINTOUTS

Generation of audio alarms has been changed in SYS 600 revision 9.1 and in SYS 500 revision 8.4.5 SP2. Audio alarms and alarm printouts are now generated independently of each other. In earlier revisions, an audio alarm was generated only when an alarm row was printed on the event printer.

When "COUPLE_AUDIO_ALARMS_AND_PRINTOUTS" is set, the audio alarms of the application are generated as in earlier program revisions.

4.1.3.

Upgrading from revision 8.4.3

DONT_RECALCULATE_AL_AFTER_ALARM_BLOCKING

Since revision 8.4.4, the alarm state is recalculated when AB is set back to 0. However, neither alarm printouts nor event channels are activated (they are not activated when AB is set to 1, neither).

"DONT_RECALCULATE_AL_AFTER_ALARM_BLOCKING" may be set if the application, for a reason or another, does not want this new behaviour.

NO_ALARM_BY_OR_AND_OF

Since revision 8.4.4, the protocol specific attribute OR (Out of Range) and OF (Overflow) value 1 generate an alarm (cf. OS value 1, or FAULTY).

"NO_ALARM_BY_OR_AND_OF" may be set if the application, for a reason or another, does not want this new behavior.

DEFAULT_DAYLIGHT_POLICY_IS_CALENDAR

In revision 8.4.4, the implementation of time handling was comprehensively rewritten. Both local and UTC time as well as daylight saving time are fully supported. There is a slight incompatibility between the new and old implementation of the scheduling of time channels: The default behaviour of time channels at daylight saving time / standard time transitions has been changed.

Prior to revision 8.4.4, the scheduling of time channels was synchronized to the local time of the system. When the local time was moved backwards at daylight saving to standard time transition, the time channels stopped for an hour. Correspondingly, at standard to daylight saving time transition, the time channels were excessively scheduled.

In revision 8.4.4, the default behaviour is that the time channels are scheduled evenly (synchronized to UTC time) when the local time changes due to daylight saving and there is a new attribute DP (Daylight Switch Policy) to specify the behaviour, see the manual "Application Objects".

When "DEFAULT_DAYLIGHT_POLICY_IS_CALENDAR" is set, the time channels created with earlier program revisions keep behaving as before. Even scheduling is the default behaviour of new time channels, however.

ALLOW_CONFLICTING_F_ATTRIBUTE_NAMES

When a pre-8.4.3 application is upgraded to 8.4.5 or later, the creation of F (Free Type) objects fails by PROF_FREE_ATTRIBUTE_NAME_ALREADY_EXISTS (2212), if the F object defines attribute names implemented as common process attributes in the base system in revisions up to 8.4.4. Examples of such conflicting attributes are RB, TI, TY, OI, BL, RB, OR and CT.

When "ALLOW_CONFLICTING_F_ATTRIBUTE_NAMES" is set, such conflicting attribute names are accepted when an F object is created.

This switch should be used only when an old application is upgraded, because the new base system functionality implemented by conflicting attributes will be lost when the name is overloaded. In addition, some common SCIL tools (such as the Object Navigator) and other SCIL software may be confused when the data type and meaning of some common attributes are not that expected.

4.1.4.

Upgrading from revision 8.4.2

NO_QUALITY_ATTRIBUTE_SEMANTICS

In revision 8.4.2 and earlier, the quality attributes SB (Substituted), BL (Blocked), OR (Out of Range) and OF (Overflow) have been information-only attributes, i.e. they have been stored in the process object to be available for SCIL but their values have not affected the behavior of the process object in any way.

In newer revisions the following rules apply:

- A change of a quality attribute generates an event if $EE = 1$
- A change of a quality attribute activates an event channel, a printout and/or history logging if the activation is enabled ($AE = 1$, $LD \neq 0$ or $HE = 1$) and the activation criterion (AA, PA or HA) is "NEW VALUE" or "UPDATE".
- In such activation, the changed attribute is reported as the value of CA pseudo-attribute. If more than one attribute is changed at the same time, each change will be reported separately in any order. For example, if OV changes from 0 to 1 and SB from 1 to 0, two activations occur, one with $CA = "BI"$, $BI = 1$ and $SB = 0$, the other with $CA = "SB"$, $BI = 1$ and $SB = 0$.
- When the switch state (SS) or the substitution state (SU) of the object is changed, the quality attributes are set to 0.

When "NO_QUALITY_ATTRIBUTE_SEMANTICS" is specified, the quality attributes behave as in revision 8.4.2 and earlier.

4.1.5.

Upgrading from revision 8.4.1

NO_ALIAS_CHECKING

Since revision 8.4.2 global variables are guarded against alias references. Status SCIL_VARIABLE_ALIASING_ERROR is generated when aliasing rules are violated.

When "NO_ALIAS_CHECKING" is set (either by the RC attribute of the application or by REVISION_COMPATIBILITY function), alias checking is not done. Turning on the switch by the RC attribute disables the checking of alias referencing in the whole application. To disable the alias reference checking locally in a program, use the REVISION_COMPATIBILITY function. The REVISION_COMPATIBILITY function is described in the "Programming Language SCIL" manual.

The arguments of method calls, as well as all the arguments of SCIL functions, are passed by copy instead of reference. This degrades performance when text, bit string, byte string, vector and list arguments are used.

If the base system will be used together with applications created with pre-8.4.2 revisions of the base system, e.g. using LIB 4.0.1, the revision compatibility switch NO_ALIAS_CHECKING should be turned on.

4.1.6. Upgrading from revision 8.4.0**SETTING_LA_AND_AG_DOES_NOT_ALARM**

In revision 8.4.0 and earlier, setting AG or LA attribute of a process object did not affect the alarm state of the object and no post-processing was done. Since revision 8.4.1, the alarm state is updated according to the new value and normal post-processing is done. Due to the change, some old applications generate unwanted alarms and printouts when run under 8.4.1 or later. To prevent this, this revision compatibility value was implemented.

The value can be used only as the value of the application attribute RC. It cannot be used as an argument of SCIL function REVISION_COMPATIBILITY, because event handling is done by the process database.

4.1.7. Upgrading from revision 8.2**DO_NOT_SYNCHRONIZE_PICTURE_UPDATE**

The timing of update programs of pictures is synchronized to the system clock (See the Programming Language SCIL manual, command !UPDATE). In revision 8.2 (or older), such a synchronization was not done. When an old application that relies on the old behavior is upgraded, this setting may be used to avoid recoding of the pictures.

When "DO_NOT_SYNCHRONIZE_PICTURE_UPDATE" is set, the executions of update programs are not synchronized. This setting does not affect the cyclic methods of Visual SCIL objects.

4.1.8. Upgrading from revision 8.1**ON_COMMAND_EXPANSION**

In revision 8.1 or older, the 'macros' of each SCIL command line were expanded before the line was interpreted. This lead to an incorrect behavior in case of a single line #ON command, as shown in the following example:

```
@A = "XYZ"
```

```
#ON EVENT:E1 #EXEC 'A':E2
```

When event EVENT:E1 occurred, command "#EXEC XYZ:E2" was executed regardless of the current value of A. Variable expansion is a run-time operation, which should use the current values of variables. The following worked correctly:

```
#ON EVENT:E1 #BLOCK #EXEC 'A':E2 #BLOCK_END
```

When "ON_COMMAND_EXPANSION" is set, the expansion of macros is done as in revision 8.1, that is, before the line is interpreted.

4.2.

LIB 5xx

Language translation

When LIB 5xx is updated there might be new attributes in language text files. This means that those attributes has to be added and translated to corresponding localized language files.

Revision compatibility switches

If only base system is updated and LIB 5xx is from earlier revision, some malfunction may occur in LIB 5xx application. This situation can be handled by means of revision compatibility switches. In this chapter the relation of revision compatibility switches having influence to LIB 5xx applications is explained. For more information about revision compatibility switches refer to Section 4.1. Base system.

NO_ALIAS_CHECKING

If SCIL_VARIABLE_ALIASING_ERROR is generated turn this switch

DONT_RECALCULATE_AL_AFTER_ALARM_BLOCKING

If base system is 8.4.4 or newer and LIB5xx application is revision 4.0.3 or older each switch device control action generated an alarm. This can be avoided by turning this switch on.

Daylight saving time

When LIB 500 is updated to revision 4.0.4 or latter a new daylight saving time mechanism is taken into use. Command procedures (BGU_SUMMER, BGU_WINTER) and related time channels handling the daylight saving time in a "old" way are disabled. A back up of the command procedures is stored to files PICT/BGU_SUMMER.CIN and PICT/WINTER_SUMMER.CIN

4.3. Monitor Pro

4.3.1. Common applications with LIB 5xx

SYS 600 revision 9.2 contains the User Management, Calendar and Login Dialog integrated from LIB 500 to SYS 600. By default, the user name and password are requested for the applications. If the application has not been previously prepared for the LIB 500 User Management, then the first operator who logs into application will be the System Manager.

By default, the User Management, Calendar and Login Dialog, are run from Power Process Library. This is applied also when the application has been prepared for the LIB 500.

For the Login Dialog, the authentication has become more strict. This means that passwords are case sensitive, i.e. passwords that have been created with SYS 600 revision 9.1 or older must be typed with upper case letters.

Defining application specific login picture

When opening classic monitor, the first visible object can be defined in file \sc\apl\aplname\ APL_Apl_Def.txt. This option can be used when application specific login dialog is opened or user login is not wanted at all. For example, the login dialog from LIB4 can be taken in use by doing the following:

1. Copy BGU_LOGIN.VSO from LIB4/BASE/BBONE/USE to APL/APL_NAME/APL_
2. Make this definition to Apl_Def.txt

```
;define starting picture
@i_monitor_number = mon:ban
#if mon'i_monitor_number':bcx == "<LIB500/INVISIBLE_MONITOR>"
#then
#block
;This monitor is reserved for the relay tools. Monitor is invisible
@Start_Object_Type = "Dialog" ;Defines the first object as a VS dialog
@Start_Dialog_File = "b_use/bgu_invisible_mon.vso"
;Needed if Start_Object_Type == "Dialog"
@Start_Dialog_Tag = "Main" ;Needed if Start_Object_Type == "Dialog"
@Start_Dialog_Type = "VS_Main_Dialog" ;Needed if Start_Object_Type == "Dialog"
#block_end

#else_if MON:BDT<>"VS"
#then
#block
@Start_Object_Type = "Picture" ;Defines the first object as a picture
@Start_Picture_Name = "APL_START" ;Needed if Start_Object_Type == "Picture"
#block_end

#else
#block
@Start_Object_Type = "Dialog" ;Defines the first object as a VS dialog
@Start_Dialog_File = "b_use/bgu_login.vso"
;Needed if Start_Object_Type == "Dialog"
@Start_Dialog_Tag = "Main" ;Needed if Start_Object_Type == "Dialog"
@Start_Dialog_Type = "VS_Main_Dialog" ;Needed if Start_Object_Type == "Dialog"
#block_end
```

In order to have Tool Manager as a first picture make the following definition:

```
@Start_Object_Type = "Dialog" ;Defines if the first object is a picture or VS dialog
@Start_Picture_Name = "APL_START" ;Needed if Start_Object_Type == "Picture"
@Start_Dialog_File = "Sys_Tool/ToolMgr.vso"
;Needed if Start_Object_Type == "Dialog"
```

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```
@Start_Dialog_Tag = "Main" ;Needed if Start_Object_Type == "Dialog"
@Start_Dialog_Type = "VS_Main_Dialog" ;Needed if Start_Object_Type == "Dialog"
@Start_Dialog_Attributes= vector("Default_Path=""Sys_Tool"",
"Notify_Parent_On_Exit = false", "Delete_Parent_On_Exit=true")
```

Filters

In SYS 600 9.2 the Event and Alarm List filters must be in predefined directory, whereas in 9.0 and 9.1 it was possible to store the filter files anywhere in the directory structure. When updating to 9.2, the filter files must be moved to directory `\sc\apl\<application name>\PAR\<user name>\FILTERS`, otherwise they are not shown in Save/Load Filter dialog.

Command procedures

Monitor Pro functionality uses some command procedures to communicate with base system. These command procedures are overwritten during the update from previous versions. If there are any modifications done to these command procedures these changes will be overwritten during the update. To avoid this, the code of the command procedures should be copied manually into text files. Following command procedures are overwritten during the update:

```
ACK_SOUND
BGU_AL
BGU_ALARMINDS
BGU_BAYLR
BGU_BLOCK
BGU_CALEN
BGU_CALMP
BGU_CONTROL
BGU_CREATEDB
BGU_EL_TS
BGU_RDRE
BGU_STALR
BGU_SUMMER
BGU_TRAFO
BGU_WINTER
SAGR_EAB_MAIN
SAGR_OBJNAV_MAIN
SAGR_REPORTS
```

Process objects

Following process objects are re-created during the installation:

```
ACK_SOUND
BGU_ALARMINDS (indexes 1..10)
```

Event handling objects

Also certain event handling are re-created. Modifications made to these objects are also lost. To avoid losing such changes, use Import/Export Tool (can be found in Tool Manager) to export the objects and import them back after installation. The name of these event handling objects start with letters "SAGR".

Starting MicroSCADA Pro without preparation for Power Process Library

If MicroSCADA is wanted to run without Power Process Library do the following actions after version 9.2 is installed and before starting MicroSCADA.

1. Comment SYS_600 specific part from the file \sc\sys\active\sys_sys_bascon.com
2. Comment SYS_600 specific part from the file \sc\Stool\Misc\Apl_Stl.txt
3. Rename file \sc\sa_lib\base\bbone\inst\INDEX5_B1.TXT to e.g. _INDEX5_B1.TXT
4. Rename file \sc\LIB4\base\bbone\use\PATH4_Z1.TXT to e.g. _PATH4_Z1.TXT

4.4.

Communication units

In principle, the process communication unit PC-NET, Modbus Slave and CDC-II slave can be upgraded to a newer version without changes in the system behavior. This chapter provides additional information related to the upgrading of IEC 61850 and External OPC Data Access Client.

If the system to be upgraded contains DCP-MUX units, they must be replaced with PC-NET process communication units. In this situation, it must be checked that all required protocols are supported by the PC-NET. Furthermore, the configuration used in DCP-MUX units must be loaded to corresponding PC-NET units with the system configuration tool or with a SCIL-script. Generally, the same attribute values for line and station objects can usually be used. Upgrading from DCP-MUX to PC-NET requires changes in serial port hardware.

The list of the protocol implemented to DCP-MUX and supported by the current version of PC-NET:

(value refers to line attribute PO)

PO value	Protocol
1	ANSI X3.28 Full Duplex or ACP
2	ANSI X3.28 Half Duplex
4	ASCII protocol for printer (or printer simulating device)
7	RP570 master protocol
9	P214 protocol
12	LCU500
13	ADLP180 Master
14	SPA protocol
15	General ASCII
16	RP570 Slave
17	RCOM (Procontic)
18	Westinghouse F4F
23	ABB Alpha meter protocol
24	General PLC protocol

Table 4.-1 *Previous and current program packages available for usage (Continued)*

PO value	Protocol
25	Modbus RTU master protocol
26	IEC 1107 protocol

If the DCP-MUX to be upgraded contains a protocol which is not listed here, the upgrading is not possible as such. In this situation, please contact SA-D SupportLine for more information.

4.4.1.

PC-NET

The main issue in the development tasks made to pc_nets.exe is to retain backward compatibility from revision to another. This principle applies also to protocols developed already to DCP-MUX hardware.

However, the differences in processor speeds, operating system versions and communication hardware together with new requirements in system setups and security will require that the system behavior must be verified after the upgrade. Before the upgrade, please read through the backward incompatibility items listed below. The listed PC-NET related issues are protocol specific and if the system to be upgraded does not contain mentioned protocols, the item has no effect in the upgrade. More information about the mentioned attributes can be found from protocol specific manuals and System Objects manual

If the behavior of a communication line after the upgrade is not satisfactory, attribute changes to the system configuration may be required. A systematic proceeding in the problem analysis usually gives best results, sometimes it is needed to record a communication log from the line which is causing problems.

4.4.1.1.

PC-NET from SYS 600 9.1 (COM 500 4.2)

In this case, there will be neither backward compatibility issues nor changes in system requirements.

4.4.1.2. PC-NET from SYS 500 8.4.x

If the previous version is SYS 500 8.4.5 SP1, SYS 500 8.4.4 SP4, SYS 600 9.0, COM 500 4.0 SP1 or older, following upgrade notification must be taken into account:

- After the upgrade, each instance of PC-NET will allocate 16 Megabytes of memory. PC-NET instance in versions SYS 500 8.4.4 SP1, COM 500 4.0 (without service packs) and older allocated 4 Megabytes of memory. In versions COM 500 4.0 SP1, SYS 500 8.4.5 SP1, SYS 500 8.4.4 SP4, SYS 600 9.0 or older but newer than SYS 500 8.4.4 SP1 the allocated amount is 8 Megabytes. In principle, the usage of a newer version may lead to lack of memory if the computer resources stay unchanged in the upgrade.

If the previous version is SYS 500 8.4.4 (without service packs), COM 500 4.0 (without service packs) or older, following upgrade notification must be taken into account:

- In DNP 3.0 slave protocol, the response handling of an incoming class 1/2/3/0 request from the DNP 3.0 master is handled differently and order of the datapoints in the response is different. It is possible that the new behaviour can be seen in the process pictures of the master also.

If the previous version is SYS500 8.4.3 SP3, COM 500 3.0 SP1 or older, following upgrade notifications must be taken into account:

- In IEC60870-5-101 slave protocol, the RM attribute bit 4 of station object controls the acceptance of the incoming control commands from the master. In the newer version the default behaviour is that a execute command is not accepted without preceding select. The behavior stays unchanged if bit 4 of the attribute RM is set, see corresponding manual for more information.
- In IEC60870-5-101 slave protocol, the TC attribute of the station object controls the handling of the incoming time synchronization. In the newer version the default value is 1 which causes the message contents to be sent to a process object also. See corresponding manual for more information.
- In any serial protocol, the line attribute RY presented in version 8.4.4 also controls the behaviour of the RTS-signal of the RS-232 port. For RocketPort serial cards, the default value RY=1 will cause the RTS signal to be active one character longer compared with the previous version. This is usually harmless. With setting RY=0 the behaviour is unchanged with RocketPort. With a standard serial port of PC, the behaviour is unchanged with setting RY=1 and depending on the used modem hardware, setting RY=0 does not necessarily work at all.

If the previous version is a DCP-MUX unit and the needed protocols can be found from the list presented in Section 4.4. Communication units, the upgrading is possible. The existing line and station attribute configuration must be converted to a SCIL script if the DCP-MUX has been configured with a NETCONF program. The DCP-MUX card is replaced with a multi-port serial card.

4.4.1.3. PC-NET from SYS 500 8.x

If the needed protocols can be found from the list presented in Section 4.4. Communication units, the upgrading of the DCP-MUX unit to PC-NET should be possible. The DCP-MUX card is replaced with a multi-port serial card having sufficient amount of COM-ports. The connected RS232-devices like modems can usually be used as such. The existing line and station attribute configuration must be converted to a SCIL script if the DCP-MUX has been configured with a NETCONF program.

4.4.2. IEC 61850**Migration of Communication Engineering Tool (CET) configurations before usage**

If the IEC 61850 CET project has been originally made with SYS 600 revision 9.0 or 9.1, and the appropriate configuration will be now taken in use in SYS 600 revision 9.2, the following steps are needed to migrate the project.

Before installing the SYS 600 revision 9.2 take a copy of your {guid}.xml files. For example:

```
23a247e6-7552-4c58-a202-eff8693f372f.xml from drive>:\sc\prog  
\61850_OPC_Server\CET\bin\Tools\OPCSCLExport.
```

After finalising the SYS 600 revision 9.2 installation, create both a new database and an IEC 61850 OPC Server to CET. Use SCLImport tool and import your existing configuration from the {guid}.xml file. A {guid} example included into above is an example of such a code, the {guid} in your projects, i.e. related .xml files differs from the example given above.

To successfully use the CET you will need 'Full Access' access rights to be assigned for everyone to the following folders:

```
<drive>:\PCMDATABASES (location depends on Environment Variable  
PCMDATADIR )
```

```
<drive>:\sc\prog\61850_OPC_Server\CET\bin
```

```
<drive>:\sc\prog\61850_OPC_Server\CET\bin\Tools\OPCSCLExport
```

The reason for this migration is that the CET databases in SYS 600 revision 9.0/9.1 and revision 9.2 are not fully compatible.



When existing CET configurations are taken in use with SYS 600 revision 9.2, it is important to also verify that the correct configuration attribute values will be taken in use by your IEC 61850 project. See further information in IEC 61850 System Design manual, chapters Timeout handling and Troubleshooting.

4.4.3. Modbus slave

Modbus slave is a separate executable used in systems with COM500*i*. The same backward compatibility approach is also used with modbus slave . The modifications made to modbus_slave.exe has been minor and upgrading to a newer version should not cause problems.

4.4.4. CDC-II slave

CDC-II slave is also a separate executable used in systems with COM500*i*. The same backward compatibility approach is also used with CDC-II slave. The modifications made to cdclslave.exe has been minor and upgrading to a newer version should not cause problems. Additional information regarding the configuration parameters related to the CDC-II slave can be found from the CDC-II Slave Protocol manual.

4.4.5. External OPC Data Access Client

External OPC Data Access Client is a separate executable used in systems including devices communicating via OPC protocol or IEC 61850 systems. Any existing configuration can be used in External OPC Data Access Client. The modifications made to daopccl.exe has been minor and upgrading to a newer version should not cause problems. Previously, when External OPC Data Access Client was delivered as a separate installation package for SYS/COM products, the destination folder for the executable was always <drive>:\MS_Interfaces\OPC_Client. For all the SYS 600 revisions, the installation of External OPC Data Access Client occurs always into folder <drive>:\sc\prog\OPC_Client. Modify the application start-up routines accordingly to start the latest External OPC Data Access Client executable, when needed. Additional information related to the configuration parameters related to the External OPC Data Access Client can be found from the External OPC Data Access Client and IEC 61850 System Design manuals.

4.5. Communication gateway**4.5.1. Upgrading COM 500 revision 2.0, 3.0, 4.0, 4.1 and 4.2**

If an existing COM 500 revision 2.0-4.2 application is updated to COM 500*i* revision 9.2, please note the following:

COM 500*i* revision 9.2 has a mechanism that makes all the required modifications to the application to update an older revision to revision 9.2. This mechanism is started when a monitor is opened to a COM 500*i* application for the first time after the installation of COM 500*i*. After the mechanism has been run, you must restart SYS 600 to take all the modifications in use. Also PQ and QD attributes should be defined for queue 16 in SYS_BASCON.

SYS_BASCON modifications:

PQ = 16,- ;Number of parallel queues/ Needed in COM 500 Applications

QD = (1,1,0,0,0,0,1,1,1,1,1,1,1,1,1,1,- ;Parallel queue dedication/ Needed in COM 500 Applications

If any project specific modifications have been made to the command procedures of the previous COM 500 revision, the modifications must be copied to the matching new command procedures. A back-up of the project specific modifications must be taken before installation of COM 500i, because all command procedures are updated during COM 500i start-up.

Base System, LIB 5xx and Communication unit changes are described in Section 4.1. Base system, Section 4.2. LIB 5xx, and Section 4.4. Communication units. The same changes should be also made when COM 500 is updated to COM 500i. Corresponding of COM 500 and SYS revisions are show in the following table:

Table 4.5.1.-1 Correspondence of COM 500 and SYS revisions

COM 500 revision	SYS revision
4.2.SP2	SYS 600 9.1.5
4.2 SP1	SYS 600 9.1 SP1
4.2	SYS 600 9.1
4.1	SYS 600 9.0
4.0 SP1	SYS 500 8.4.4 SP1
4.0	SYS 500 8.4.4
3.0 SP2	SYS 500 8.4.3 SP4
3.0 SP1	SYS 500 8.4.3 SP2
3.0	SYS 500 8.4.3
2.0	SYS 500 8.4.2

4.5.2. Upgrading COM 500i revision 1.0

For more information about upgrading revision 1.0, refer to the Communication Gateway, COM 500i User's Guide.

4.6. Updating device drivers

In general the device drivers are backwards compatible within a major revision number, that is, drivers in 8.4.2 revision is used with Base System Software of revisions 8.4.1 and 8.4.0.

When updating to MicroSCADA Pro, the driver packages can be installed from the MicroSCADA Pro software CD or they are included to adapter card package. The supported versions of the drivers can also be downloaded from the web sites of the respective manufacturers :

ADLink site: <http://www.adlink.com.tw/home.htm>

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Advantech site: <http://www.advantech.com>

Meinberg site: <http://www.meinberg.de>

DHelectrnics: <http://www.xlon.de>

5. Abbreviations

Abbreviation	Description
ASCII	American Standard Code for Information Interchange
GB	Gigabyte
HSB	Hot Stand-by
LAN	Local area network
MB	Megabyte
PCI	Peripheral Component Interconnect
RAM	Random access memory
SCIL	Supervisory Control Implementation Language
TCP	Transmission Control Protocol
TS CAL	Terminal service client access license



ABB Oy
Substation Automation Products
P.O. Box 699
FI-65101 Vaasa
FINLAND
Tel. +358 10 2211
Fax. +358 10 224 1094
www.abb.com/substationautomation